C21.5: 956/4

Vol. 956 Number 4

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

March 22, 1977

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

March 22, 1977 Volume 956 Number 4

CONTENTS

	Page
Patent and Trademark Notices	
Use of Patent Examining Group Facilities	1118
Patent Suits	1118
Patent Notices	
Adverse Decisions in Interferences	1120
Certificates of Correction for the Week of March 22, 1977	1120
Disclaimers	1120
Disclaimer and Dedication	1120
Condition of Patent Applications	1122
Reissue Patents Granted (29,155)	1123
Plant Patents Granted (4,023)	1125
Patents Granted	
General and Mechanical (4,012,794)	1127
Chemical (4,013,404)	1335
Electrical (4,013,826)	1455
Design Patents Granted (243,721)	1529
Index of Patentees	PI 1
Cross Reference of Published Patent Applications Published Under Second Trial Voluntary Protest Program	PI 41
Indices of Applicants of Reissues, Plants and Designs	PI 49
Classification of	
Patents (Including Reissues)	PI 51
Designs and Plants	PI 54
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 55
Designs and Plants	PI 56

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Use of Patent Examining Group Facilities

This notice is supplemental to the Notice of July 9, 1976, entitled "Public Search Room for Patents" that was published in the OFFICIAL GAZETTE on August 3, 1976 (949 O.G. 2).

The primary function of the Patent and Trademark Office is the examination of applications for patents and the issuance of valid patents based upon a search and consideration of the best available prior art. This can be accomplished only through maintaining strict search file integrity within the Patent Examining Group Facilities.

Therefore, under the provision of Rule 2 of the "Regulations for the Public Use of Records in the Public Search Room for Patents of the Patent and Trademark Office," 949 O.G. 2, the regulations appearing below are established for those authorized members of the Public using the facilities of the Patent Examining Groups. The regulations become effective April 4, 1977.

Although these supplemental regulations may cause some inconvenience, it is believed that with the cooperation and understanding of the public, a more efficient and reliable examination system within the Patent Examining Groups will result.

A copy of the following "Regulations for Users of the Patent Examining Group Facilities," will be posted in each of the Patent Examining Groups and the Public Search Room for Patents:

REGULATIONS FOR USERS OF THE PATENT EXAMINING GROUP SEARCH FACILITIES

1. Group facilities are defined as those areas in Buildings, 3, 34 and 4 of Crystal Plaza designated Examining Groups.
2. The use of the Group facilities for search purposes by members of the public is strictly limited to the search of materials not available in the Public Search Room for Patents or the Scientific Library and when it does not conflict with the regular business of Patent and Trademark personnel and only between the hours of 8:45 a.m. and 4:45 p.m. on regular business days.
3. Authorized Officials, under these Regulations, include Supervisory Patent Examiners and Examining Group Directors.
4. Under applicable statutes and regulations, including 40 U.S.C. 486(c); 41 CFR Subpart 101–20.3; and appropriate Sections of Department Organization Orders 30–3A and 30–3B of the Department of Commerce, the Regulations appearing below are established for those members of the public using the Group Facilities.
   - A. All persons using these facilities are subject to the Regulations Governing Conduct on Federal Property, as specified in 41 CFR Subpart 101–20.3.
   - B. All posted Official Notices are to be complied with.
   - C A valid User Pass must be prominently displayed when searching in the Group Facilities. User Passes are nontransferable and must be surrendered upon request to authorized officials.
   - D. All persons holding User Passes must register with the Group Receptionist, unless otherwise directed, in each Examining Group where they search and must sign a log (e.g., indicating time-in, time-out, name, User Pass number, class(es) and subclass(es) searched).
   - E. No patents, records or other documents of the Patent and Trademark Office shall be removed from the Group Facilities except by express written authorization by an authorized official in the Examining Group where the material resides. Such authorization will not be given for U.S. patents and other material readily available through the Scientific Library.
   - F. Smoking is not permitted except in designated areas.
   - G. No food or beverages in any form are to be consumed except in designated areas.
   - H. Loud talking, use of radios, and any other form of activity which may disturb other members of the public or Patent and Trademark Office personnel are forbidden.
   - I. Children brought into the Group Facilities must not be allowed to disturb others.
   - J. The presence or use of equipment such as dictation equipment, reproducing machines, typewriters and photographic equipment is prohibited without prior permission from an authorized official in the Examining Group where the use is intended and then is permitted where its use does not conflict with Regulation H.
   - K. Patents and other documents must not be removed from their shoes for any reason other than for cursory study thereof while kept in close proximate association with the shoe and must not be moved out of their normal sequence.
   - L. All patent shoes must be promptly replaced in their proper location in the shoe case.
   - M. All textbooks, journals and the like must be returned to their proper location.
   - N. The reserving of seats and/or working areas is prohibited.
   - O. All packages, briefcases or other personal effects brought into the Group Facilities are subject to search by authorized officials upon request and must be removed when leaving the Group Facilities.
   - P. All verbal requests for compliance with these regulations of other posted Patents and Trademark Office Notices pertaining to activity in the Group Facilities, when made by authorized officials, must be promptly complied with.
5. Persons violating these regulations may be denied the use of the facilities in the Examining Groups and Public Search Room for Patents, and may further be subject to prosecution under the Criminal Code. Additionally, the name of any person violating these regulations who is registered to practice before the Patent and Trademark Office may be forwarded to the Solicitor for appropriate action under 37 CFR 1.348.

WILLIAM FELDMAN,
Deputy Assistant Commissioner for Patents.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,844,127, C. Steiner, FLUID PRESSURE TORQUE CONVERTER; **2,844,128**, same, **filed** Apr. 17, 1975, United States Court of Claims (District of Columbia), Doc. 123–75, *Flo-Tork, Inc.* v. *United States and Hydra Power Inc.* Case dismissed with prejudice under Rule 102(a)(1)(iii). Agreement between plaintiff and the third-party defendant has rendered this litigation moot. Nov. 2, 1976.

2,844,128. (See 2,844,127.)

2,998,258, A. A. Ambrose, ADAPTER FOR LATHE CHUCK AND THE LIKE, **filed** June 30, 1976, D.C., E.D. Mich. (Detroit), Doc. 76–71374, *True Grip, Inc.* v. *Sturdy Broaching Service, Inc.*

3,071,856, I. W. Fischbein, RAZOR BLADE AND METHOD OF MAKING SAME; **3,518,110**, same, **filed** Nov. 4, 1976, D.C. Del. (Wilmington) Doc. 76–375, *Societe Bic, S.A. and Bic Pen Corporation* v. *Gillette Company.*

3,407,685, E. D. Prince, GROOVED TIEBAR ASSEMBLY FOR DIECASTING MACHINES AND THE LIKE, **filed** June 15, 1973. D.C., W.D. Mich. (Grand Rapids), Doc. G145–73, *Prince Corporation* v. *B & T Machinery Company (Ex-Cello Corporation), and Edgar D. Prince.* Defendant has infringed upon said patent by making and selling die casting machines embodying apparatus falling within scope of the claims of said patent, Oct. 27, 1976.

3,452,895, K. U. Kalkowski, UTENSIL FOR PREVENTING SPRAYING WITH FRYING PANS, COOKING POTS OR THE LIKE, **filed** Mar. 25, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c743, *Kurt Ulrich Kalkowski* v. *Ronco, Inc.* Judgment, the Court finds for the defendant and against the plaintiff on the complaint and finds in favor of the counter-defendant on the counterclaim. The Court finds the patent invalid, Oct. 27, 1976.

3,486,495, H. W. Allen, ARCHERY BOW WITH DRAW FORCE MULTIPLYING ATTACHMENTS, **filed** Oct. 26, 1976, D.C. Utah (Salt Lake City), Doc. NC-76-53, *Allen Archery, Inc.* v. *Browning Manufacturing Company and Browning Arms Company.*

3,518,110. (See 3,071,856.)

3,537,146, J. E. Caveney, INTEGRAL ONE-PIECE CABLE TIE; **3,660,869,** Caveney and Moody, ONE-PIECE CABLE TIE; **3,906,593,** same, INTEGRAL CABLE TIE, **filed** Oct. 29, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4012, *Panduit Corp.* v. *All States Plastic Mfg. Co.*

3,560,669, Foulkes and Bender, ECHO SUPPRESSOR, **filed** Nov. 1, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4040, *Wescom, Inc.* v. *Tellabs, Inc.*

3,583,385, F. W. Beller, CAMPSTOVE WITH ADJUSTABLE AND PIVOTABLE GRILL, **filed** Nov. 4, 1976, D.C., W.D. Mich. (Grand Rapids), Doc. K76-566Ca, *Belson Manufacturing Company, Inc.* v. *Quality Industries, Inc.*

3,630,066, F. L. Chisum, APPARATUS FOR RETURNING VEHICLE BODY AND FRAME COMPONENTS TO THEIR ORIGINAL LOCATIONS DURING REPAIR AND SERVICING OF VEHICLES; **3,888,100,** F. L. Chisum, AUTO BODY AND FRAME STRAIGHTENING DEVICES, **filed** Mar. 26, 1976, D.C. Minn. (Minneapolis), Doc. 4-76-C 134, *Square Liner 360°, Inc.* v. *Finis Lavell Chisum and Chisum Products Company, Inc.*

3,660,869. (See 3,537,146.)

3,711,866, R. W. Flentage, POWER RACK; **Re. 28,499,** same, **filed** Oct. 3, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c3312, *A. F. Dormeyer Manufacturing Co., Inc.* v. *Coils, Inc.* Defendant is hereby permanently restrained and enjoined from directly or indirectly infringing said patent and said reissue patent. The counterclaim asserted by defendant in its answer to the complaint be and hereby is dismissed with prejudice, Oct. 22, 1976.

3,805,819, B. E. Etter, METHOD AND MEANS OF APPLYING ADDITIVES TO INDUSTRIAL GAS; **3,870,069,** same; **3,924,648,** same; **3,982,883,** same, METHOD OF FLAME CUTTING, **filed** Oct. 29, 1976, D.C., N.D. Ga. (Atlanta), Doc. C76-1812A, *Flamex Distributors, Inc.* v. *O. M. Taylor et al.*

3,829,348, Spiegel and Miller, DECORATING THREE-DIMENSIONAL OBJECTS, **filed** Nov. 4, 1976, D.C., E.D. Pa. (Philadelphia), Doc. 76-3438, *Gilbreth International Corporation* v. *Gaudio Brothers, Inc. and S. S. Kresge Company.*

3,836,767, M. L. Lasker, LIGHTING FIXTURES, **filed** Nov. 5, 1976, D.C. Del. (Wilmington), Doc. 76,381, *Wylain, Inc.* v. *Walter Kidde Consumer Durables.*

3,859,565, L. A. Henningsen, FIRE PUMP CONTROL APPARATUS, **filed** June 20, 1975, D.C.N.J. (Newark), Doc. 75-1087, *Firetrol, Inc.* v. *Lexington Control, Inc.* Stipulation and order of dismissal, Oct. 29, 1976.

3,870,069. (See 3,805,819.)

3,888,100. (See 3,630,066.)

3,906,593. (See 3,537,146.)

3,924,648. (See 3,805,819.)

3,963,895, J. M. Hennion, DEVICE FOR EFFECTING THE GUIDING AND OSCILLATION MOVEMENTS OF A WELDING HEAD EQUIPPED WITH AN ELECTRODE-CARRIER NOZZLE, **filed** June 15, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2201, *National Presto Ind.* v. *Scovill Mfg. Co. et al.* Above cause of action is hereby dismissed without prejudice, Nov. 4, 1976.

3,982,883. (See 3,805,819.)

Re. 28,499. (See 3,711,866.)

3,379,617, Andrews and Keller, MEANS FOR SUPPORTING FUEL ELEMENTS IN A NUCLEAR REACTOR; **3,379,618,** E. Frisch, FUEL ARRANGEMENT FOR A NUCLEAR REACTOR, **filed** Jan. 30, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c270, *Westinghouse Electric Corporation* v. *General Electric Company.* Second counterclaim and all claims are dismissed with prejudice, with each party to bear its own costs, Nov. 9, 1976.

3,379,618. (See 3,379,617.)

3,605,366, G. Zakim, COMPOSITE LAMINATE PANEL CONSTRUCTION, **filed** Feb. 3, 1975, D.C.N.J. (Camden), Doc. C-75-0178, *Gerald Zakim* v. *Formigili Corporation.* It is hereby stipulated and agreed by and between the respective parties hereto, that the complaint and counterclaim be dismissed with prejudice, Nov. 3, 1976.

3,675,247, J. Ferrell, METHOD FOR FABRICATING PANTY HOSE, **filed** Nov. 14, 1975, D.C., W.D.N.C. (Statesville), Doc. ST-C-75-53, *Tights Inc.* v. *Burlington Industries Inc.* Stipulation of dismissal, Oct. 26, 1976.

3,675,247, J. Ferrell, METHOD FOR FABRICATING PANTY HOSE; **Re. 26,350,** E. Rice, COMBINATION STOCKINGS AND PANTY, **filed** Mar. 21, 1975, D.C., W.D.N.C. (Statesville), Doc. C-C-75-78, *Tights Inc.* v. *Brevoni Hosiery Corp. (formerly Schulte & Dieckhoff Inc.).* Stipulation of dismissal, Oct. 29, 1976.

3,721,968, G. Gee, MAGNETIC PICKUP, **filed** July 21, 1975, D.C., E.D. Pa. (Philadelphia), Doc. 75-2067, *Electro Corporation* v. *Transducer Systems Inc. and Burton F. Drill.* It is hereby ordered, defendants, their officers, agents, servants, employees are hereby permanently enjoined from infringing Gee patent. Plaintiff is granted final judgment for damages against defendants. This judgment is entered without trial, by consent of both parties, Nov. 8, 1976.

3,925,751, Bateman and Muller, GLIDE SLOPE WARNING SYSTEM; **3,934,221,** same, TERRAIN CLOSURE WARNING SYSTEM WITH ALTITUDE RATE SIGNAL CONDITIONING; **3,936,796,** C. Bateman, AIRCRAFT GROUND PROXIMITY WARNING INSTRUMENT; **3,946,358,** same; **3,947,808,** same, EXCESSIVE DESCENT RATE WARNING SYSTEM FOR AIRCRAFT; **3,947,810,** Bateman and Muller, NEGATIVE CLIMB RATE AFTER TAKE-OFF WARNING SYSTEM WITH PREDETERMINED LOSS OF ALTITUDE INHIBIT; **3,958,219,** same, TERRAIN CLOSURE WARNING SYSTEM WITH ALTITUDE RATE SIGNAL CONDITIONING, **filed** Nov. 8, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c4123, *Sundstrand Data Control Inc.* v. *Collins Radio Company.*

3,925,751, Bateman and Muller, GLIDE SLOPE WARNING SYSTEM; **3,934,221,** same, TERRAIN CLOSURE WARNING SYSTEM WITH ALTITUDE RATE SIGNAL CONDITIONING; **3,936,796,** C. Bateman, AIRCRAFT GROUND PROXIMITY WARNING INSTRUMENT; **3,946,358,** same; **3,947,808,** same, EXCESSIVE DESCENT RATE WARNING SYSTEM FOR AIRCRAFT; **3,947,809,** same, BELOW GLIDE SLOPE ADVISORY WARNING SYSTEM FOR AIRCRAFT; **3,947,810,** Bateman and Muller, NEGATIVE CLIMB RATE AFTER TAKE-OFF WARNING SYSTEM WITH PREDETERMINED LOSS OF ALTITUDE INHIBIT; **3,958,219,** same, TERRAIN CLOSURE WARNING SYSTEM WITH ALTITUDE RATE SIGNAL CONDITIONING, **filed** Nov. 8, 1976, D.C., S.D. Fla. (Miami), Doc. F1-76-6485-C-JE, *Sundstrand Data Control Inc.* v. *Northwest Airlines Inc., Bendix Corporation and Delta Airlines Inc.*

3,934,221. (See 3,925,751.)

3,936,796. (See 3,925,751.)

3,946,358. (See 3,925,751.)

3,947,808. (See 3,925,751.)

3,947,809. (See 3,925,751.)

3,947,810. (See 3,925,751.)

3,958,219. (See 3,925,751.)

Re. 25,360. (See 3,675,247.)

Re. 26,538, J. Bott, LUGGAGE RACK; **Re. 26,539,** same, **filed** Oct. 28, 1976, D.C., E.D. Mich. (Detroit), Doc. 76-72254, *John A. Bott* v. *Eastland Imports Inc. and George Byers Sons Imports.*

Re. 26,539. (See Re. 26,538.)

Erratum

Under Patent Suits, in the OFFICIAL GAZETTE of July 22, 1975, volume 936, page 1168, the entire paragraph beginning with 3,749,974 should be deleted.

PATENT NOTICES

Certificates of Correction for the Week of Mar. 22, 1977

Re. 29,060	3,957,494	3,986,055	3,994,324
Re. 29,063	3,960,042	3,986,161	3,994,387
Re. 29,067	3,962,287	3,987,184	3,994,392
3,391,420	3,965,210	3,987,185	3,994,732
3,406,894	3,967,546	3,987,368	3,994,798
3,500,215	3,970,367	3,987,412	3,995,078
3,629,686	3,972,065	3,987,688	3,995,088
3,644,153	3,973,128	3,988,337	3,995,231
3,661,189	3,974,176	3,988,597	3,995,392
3,724,779	3,974,242	3,988,657	3,995,531
3,751,677	3,975,976	3,988,748	3,995,668
3,759,727	3,976,399	3,988,875	3,995,841
3,791,825	3,977,310	3,988,966	3,995,929
3,865,807	3,977,957	3,989,139	3,996,037
3,872,058	3,978,485	3,989,348	3,996.075
3,877,952	3,979,433	3,989,410	3,997,008
3,892,109	3,980,791	3,990,055	3,997,014
3,897,463	3,981,686	3,990,377	3,997,288
3,911,334	3,981,846	3,990,478	3,997,352
3,914,380	3,982,381	3,990,507	3,997,485
3,916,019	3,982,419	3,990,529	3,997,548
3,918,210	3,982,705	3,990,603	3,997,570
3,920,912	3,983,315	3,990,816	3,997,584
3,925,056	3,983,319	3,990,829	3,997,608
3,926,659	3,984,278	3,990,890	3,997,684
3,928,403	3,984,312	3,990,897	3,997,687
3,931,363	3,984,398	3,991,031	3,997,974
3,933,602	3,984,419	3,991,307	3,998,008
3,937,981	3,984,454	3,991,579	3,998,272
3,940,269	3,984,474	3,991,658	3,998,479
3,944,189	3,984,777	3,991,849	3,998,615
3,945,985	3,984,814	3,992,229	3,998,623
3,946,729	3,985,028	3,992,329	3,998,746
3,948,665	3,985,095	3,992,425	3,999,121
3,948,705	3,985,125	3,992,439	3,999,582
3,948,795	3,985,151	3,992,493	3,999,636
3,948,847	3,985,368	3,992,696	3,999,701
3,950,333	3,985,437	3,992,763	3,999,855
3,950,353	3,985,656	3,992,827	4,000,058
3,952,172	3,985,664	3,992,915	4,000,149
3,952,437	3,985,756	3,993,348	4,000,302
3,953,428	3,985,908	3,993,891	4,000,535
3,955,037	3,985,973	3,994,285	

Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 2,948,928, H. Ebneth and H. Falk, PROCESS FOR MANUFACTURING FOAMED POLYURETHANE ARTICLES, Interference No. 95,554, decided Oct. 19, 1976, claims 1 and 2.

Patent No. 3,397,793, R. W. MacDonnell, PLEATED FILTER, Interference No. 99,154, decided Dec. 7, 1976, claims 1–5.

Patent No. 3,497,320, W. E. Blackburn, D. A. Hamilton, L. A. Inners and G. C. Reid, AUTOMATED CHEMICAL ANALYZER, Interference No. 97,825, decided Sept. 23, 1976, claims 29–37, 40, 42, 43, 45, 48, 52–55, 59, 68, 70, 71, 74 and 101–105.

Patent No. 3,497,320, W. E. Blackburn, D. A. Hamilton, L. A. Inners and G. C. Reid, AUTOMATED CHEMICAL ANALYZER, Interference No. 97,827, decided Sept. 23, 1976, claims 67 and 115.

Patent No. 3,504,376, T. F. Bednar, G. C. Reid and A. T. Yahiro, AUTOMATED CHEMICAL ANALYZER, Interference No. 97,829, decided Sept. 23, 1976, claims 112, 113, 114, 115, 116, 117, 118 and 119.

Patent No. 3,504,376, T. F. Bednar, G. C. Reid and A. T. Yahiro, AUTOMATED CHEMICAL ANALYZER, Interference No. 97,826, decided Sept. 23, 1976, claims 56–60, 62–64, 66, 68, 69, 71, 72, 107, 108, 131, 133–136 and 139–141.

Patent No. 3,577,426, C. K. McGill and G. W. Campbell, Jr., 4-(4-TETRAHYDROPYRANYL) PYRIDINES, Interference No. 99,001, decided Nov. 18, 1976, claim 2.

Patent No. 3,616,269, D. Aelony and W. J. McKillip, METHOD FOR THE PURIFICATION OF MALONONITRILE BY THE ADDITION OF CYCLOPENTADIENE FOLLOWED BY DISTILLATION, Interference No. 98,508, decided Oct. 22, 1976, claims 1, 2, 3, 4 and 5.

Patent No. 3,619,483, W. K. Boots and W. D. Murphy, CONTINUOUS ELECTRONIC FILM SCANNER, Interference No. 98,537, decided July 22, 1976, claims 1, 2, 3 and 8.

Patent No. 3,676,580, J. H. Beck, INTERROGATED TRANSPONDER SYSTEM, Interference No. 98,853, decided Sept. 15, 1976, claims 13 and 14.

Patent No. 3,676,921, E. Kooi, SEMICONDUCTOR DEVICE COMPRISING AN INSULATED GATE FIELD EFFECT TRANSISTOR AND METHOD OF MANUFACTURING THE SAME. Interference No. 98,572, decided Oct. 9, 1976, claims 1–8.

Patent No. 3,783,659, G. F. Rossi, BICYCLE SECURING APPARATUS, Interference No. 98,753, decided Oct. 8, 1976, claims 1, 2 and 3.

Patent No. 3,810,992, J. J. Menn, ANTHELMINTIC BISTHIOUREIDO BENZENE DERIVATIVE, Interference No. 99,307, decided Nov. 15, 1976, claim 1.

Patent No. 3,828,109, E. S. Morez, CHORUS GENERATOR FOR ELECTRONIC MUSICAL INSTRUMENT, Interference No. 99,240, decided Dec. 20, 1976, claims 1 and 9.

Patent No. 3,840,881, K. Koizumi, F. Yonai, M. Yamauchi and Y. Utamura, LIGHT EXPOSURE APPARATUS FOR FORMATION OF STRIPED PHOSPHOR SCREENS OF COLOR PICTURE TUBES, Interference No. 99,342, decided Dec. 20, 1976, claims 1, 2, 3, 5, 6 and 8.

Patent No. 3,876,598, D. S. Brackman, PHOTODEGRADABLE POLYVINYL CHLORIDE COMPOSITIONS CONTAINING A FERROCENE PRODEGRADANT, Interference No. 99,356, decided Dec. 23, 1976, claims 1 and 2.

Patent No. 3,892,811, Y. G. Chang and P. S. Bailey, ORGANIC PEFOXIDES AND METHOD THEREFOR, Interference No. 99,226, decided Nov. 4, 1976, claims 1 and 2.

Patent No. 3,936,302, Y. Takami, K. Fukuda and E. Yamazaki, METHOD FOR MANUFACTURING FLUORESCENT SCREENS FOR USE IN COLOUR PICTURE TUBES, Interference No. 99,328, decided Dec. 15, 1976, claims 1 and 3.

Disclaimer and Dedication

3,444,704.—*Gus T. Smith,* Paducah, Ky. THROAT PLATE. Patent dated May 20, 1969. Disclaimer and dedication filed Jan. 25, 1977, by the assignee, *Marvel Specialty Co., Inc.*

Hereby enters this disclaimer and dedicates to the Public all claims of said patent.

Disclaimers

Re. 26,096.—*Frederick A. Lambach,* Omaha, Nebr. FISHING FLOAT. Patent dated Oct. 11, 1966. Disclaimer filed July 23, 1976, by the assignee, *Plastilite Corporation.*

Hereby enters this disclaimer to claims 1 and 2 of said patent.

3,237,149.—*Warren H. West,* Seabrook Beach, N.H. ELECTRIC CONNECTOR. Patent dated Feb. 22, 1966. Disclaimer filed Jan. 17, 1977, by the assignee, *Cambridge Thermionic Corporation.*

Hereby enters this disclaimer to claims 1–3 of said patent.

3,293,405.—*Raphael J. Costanzo*, Bridgeport, Conn. ELECTRICALLY HEATED FOOTWEAR. Patent dated Dec. 20, 1966. Disclaimer filed Jan. 17, 1977, by the inventor.

Hereby enters this disclaimer to claims 1 through 4 of said patent.

3,652,376.—*Jame G. Bowden III*, Weston, Mass. MULTIPLY PRESS PACKING FOR THE IMPRESSION MEMBER IN A LETTER PRESS. Patent dated Mar. 28, 1972. Disclaimer filed Feb. 7, 1977, by the assignee, *W. R. Grace & Co.*

Hereby enters this disclaimer to all claims of said patent.

3,855,613.—*Louis Sebastian Napoli*, Hamilton Square, and *Raymond Harkless Dean*, Lawrenceville, N.J. A SOLID STATE SWITCH USING AN IMPROVED JUNCTION FIELD EFFECT TRANSISTOR. Patent dated Dec. 17, 1974. Disclaimer filed Jan. 21, 1977, by the assignee, *RCA Corporation*.

Hereby enters this disclaimer to claim 3 of said patent.

3,876,598.—*Derek Samuel Brackman*, Stanmore, England. PHOTODEGRADABLE POLYVINYL CHLORIDE COMPOSITIONS CONTAINING A FERROCENE PRODEGRADANT. Patent dated Apr. 8, 1975. Disclaimer filed Sept. 23, 1976, by the assignee, *Imperial Chemical Industries Limited*.

Hereby enters this disclaimer to claims 1–4 of said patent.

3,884,671.—*James A. Albright*, St. Louis, Mich., and *Kenneth P. Dorschner*, Vienna, Va. HERBICIDAL N-HALOACYL (2-ALKYLATED) OXAZOLIDINES. Patent dated May 20, 1975. Disclaimer filed Jan. 21, 1977, by the assignee, *SCM Corporation*.

Hereby enters this disclaimer to claim 3 of said patent.

3,947,516.—*Klaus Hunger*, Kelkheim, Taunus, and *Theodor Papenfuhs*, Frankfurt/Main, Germany. NOVEL AROMATIC ALDEHYDES AND PROCESS FOR PREPARING THEM. Patent dated Mar. 30, 1976. Disclaimer filed Jan. 25, 1977, by the assignee, *Hoechst Aktiengesellschaft*.

Hereby enters this disclaimer to claims 1 to 6 of said patent.

3,982,023.—*Bernard J. Bahoshy*, Mahopac, and *Robert E. Klose*, West Nyack, N.Y., and *Harold A. Nordstrom*, Reading, Mass. CHEWING GUMS OF LONGER LASTING SWEETNESS AND FLAVOR. Patent dated Sept. 21, 1976. Disclaimer filed Jan. 10, 1977, by the assignee, *General Foods Corporation*.

The term of this patent subsequent to Mar. 19, 1993 has been disclaimed.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 26, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	4-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-1-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-12-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-9-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-7-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	9-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	3-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	8-2-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	5-3-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-2-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	7-22-76

Expiration of patents: The patents within the range of numbers indicated below expire during March 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,926,352 to 2,931,037, inclusive
Plant Patents..... Numbers 1,919 to 1,925, inclusive

REISSUES

MARCH 22, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

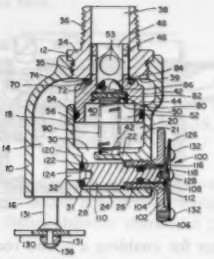
Re. 29,155
ON-OFF SPRINKLER

James W. Mears, Warwick, and William J. O'Brien, Barrington, both of R.I., assignors to Grinnell Fire Protection Systems Company, Inc., Providence, R.I.

Original No. 3,757,866, dated Sept. 11, 1973, Ser. No. 196,641, Nov. 8, 1971. Application for reissue Sept. 3, 1975, Ser. No. 610,013

Int. Cl.[2] **A62C** *37/08*

U.S. Cl. 169—37 **7 Claims**



1. A water sprinkler device for a fire protection system coupled to a pressurized fluid supply line; comprising in combination:

a sprinkler body having an annular inlet portion adapted for coupling to said fluid supply line;

means providing an inner wall for dividing said sprinkler body into a first bifurcation, having an outlet portion that defines a main fluid flow passageway between said inlet portion and said outlet portion, and a second bifurcation that defines a control chamber;

a deflector mounted adjacent said outlet portion to deflect fluid flow therethrough;

means providing a valve seating surface abutting said inlet portion at the junction of said bifurcations;

a main valve disposed in a direction downstream from said seating surface and having a valve seat mounted in opposed relation to said seating surface so as to oppose fluid pressure from said inlet portion that tends to cause said valve seat to separate from said seating surface to open said valve;

said main valve being slideable into said control chamber for controlling fluid flow through said main passageway while maintaining said control chamber blocked to fluid flow from said outlet portion;

an aperture formed substantially centrally in said main valve to define a control passageway that couples fluid from said inlet portion to said control chamber;

said main valve exhibiting a first surface area disposed toward said control chamber that is greater than a second surface area disposed toward said inlet portion to provide a greater main valve closing pressure than opening pressure;

means providing an outlet port from said control chamber to release fluid pressure therefrom to open said main valve;

pilot valve means having a valve member mounted to control fluid flow through said outlet port and including a bimetallic disc centrally connected to said valve member, and

means for securing the peripheral edges of said bimetallic disc against movement relative to said sprinkler body so as to flex said disc in a manner to resiliently bias said valve member to close said outlet port, said disc responding to temperature rise to snap to an opposite flexure to open said outlet port to release fluid from said control chamber to open said main valve.

Re. 29,156
FUEL BY-PRODUCTS OF MUNICIPAL REFUSE

Paul G. Marsh, Hamilton, Ohio, assignor to Black Clawson Fibreclaim, Inc., New York, N.Y.

Original No. 3,830,636, dated Aug. 20, 1974, Ser. No. 203,295, Nov. 30, 1971. Continuation-in-part of Ser. No. 94,084, Dec. 1, 1970, Pat. No. 3,736,223, which is a continuation-in-part of Ser. No. 14,431, Feb. 26, 1970, abandoned, and a continuation-in-part of Ser. No. 99,554, Dec. 18, 1970, Pat. No. 3,714,038. Application for reissue Jan. 27, 1976, Ser. No. 652,756

The portion of the term of this patent subsequent to Jan. 30, 1990, has been disclaimed.

Int. Cl.[2] **C10L** *5/00;* **F23G** *3/00, 5/00*

U.S. Cl. 44—1 D **10 Claims**

11. As a new product, a particulate mixture consisting essentially of organic constituents of municipal refuse substantially free of inorganic materials, and prepared by a process comprising the steps of:

1. depositing solid waste materials including relatively frangible and infrangible organic and inorganic solids and a liquid medium in a treatment vessel,

2. subjecting said solids in the presence of said liquid medium in said treatment vessel to forces of sufficient intensity to reduce said relatively frangible organic and inorganic solids to particles of less than a predetermined maximum size forming a mixture with said liquid medium,

3. removing from said treatment vessel in slurry form a portion of said liquid medium and such of said organic and inorganic particles as pass through perforations sized to pass only particles of less than said predetermined maximum size,

4. removing said relatively infrangible solids from said treatment vessel separately from said slurry,

5. removing from said slurry the inorganic constituents thereof,

6. accumulating a substantial volume of the resulting slurry of said organic solids and liquid medium to assure the homogeneity thereof, and

7. removing from said accumulated slurry a substantial portion of said liquid medium to leave said particulate mixture, the major component material of said mixture being cellulose fibers, the particles in said mixture being of less than a predetermined maximum particle size, and said mixture having the following additional characteristics on a volumetric unit basis:

a. substantial homogeneity of component materials;

b. substantial uniformity from the standpoint of distribution of particle sizes;

c. substantially uniform moisture content; and

d. substantially uniform fuel value.

Re. 29,157

HIGH TEMPERATURE RESISTANT POLYCHLOROPRENE ADHESIVE RESIN

Kenneth C. Petersen, Scotia, and Thomas M. Galkiewicz, Schenectady, both of N.Y., assignors to Schenectady Chemicals, Inc., Schenectady, N.Y.

Original No. 3,617,591, dated Nov. 2, 1971, Ser. No. 46,545, June 15, 1970. Continuation-in-part of Ser. No. 873,059, Oct. 31, 1969, abandoned. Application for reissue July 10, 1972, Ser. No. 270,026

Int. Cl.² C08L *91/00*

U.S. Cl. 260—25 **13 Claims**

20. An adhesive composition comprising a polymer of chloroprene and the thermoplastic heat reaction product of a zinc compound selected from the group consisting of zinc carbonate, zinc borate, basic zinc carbonate, zinc salicylate and zinc phosphate, and an alkaline condensed alkyl or aryl substituted phenol-formaldehyde resin made by condensing formaldehyde and the phenol in a molar ratio of from 0.395:1 to 1.29:1.

Re. 29,158

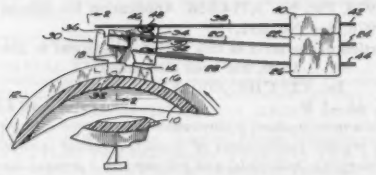
TIMER BLADE ARRANGEMENT

Roger J. Cartier, Hoffman Estates; George Obermann, Niles, and John Willigman, Elk Grove Village, all of Ill., assignors to The Singer Company, New York, N.Y.

Original No. 3,752,944, dated Aug. 14, 1973, Ser. No. 194,184, Nov. 1, 1971. Application for reissue Feb. 10, 1975, Ser. No. 548,201

Int. Cl.² H01H *3/42*

U.S. Cl. 200—38 B **17 Claims**



1. A timer including a program member rotatable about an axis and provided with spaced cams,

a switch fixed relative to the program member for actuation by a cam,

said switch including two blades the free ends of which are biased towards the program member,

a follower *molded* on one of the blades engaging a cam whereby the cam actuates said one blade relative to the other,

follower means molded on the second blade engaging the program member to reference the second blade relative to the program member *and to constrain the second blade against lateral movement.*

Re. 29,159

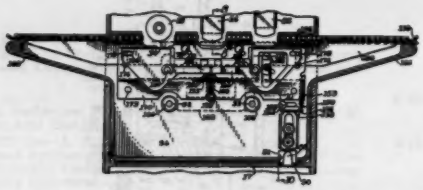
VERTICAL RECORD CARD ADAPTER FOR RECORD TAPE MACHINE

George F. Krtous, Chicago, and Carl G. Schreyer, Highland Park, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Original No. 3,584,882, dated June 15, 1971, Ser. No. 837,383, June 30, 1969. Application for reissue Feb. 25, 1972, Ser. No. 229,594

Int. Cl.² G11B *5/00*

U.S. Cl. 360—88 **18 Claims**



1. An adapter for enabling a sound recorder-reproducing machine, having a deck surface which defines a cassette receiving station and also having means for driving the record tape in a cassette mounted thereon into intelligence transfer association with an electromagnetic transducer adjacent said driving means, to handle a record card having parallel tracks of magnetic recording medium, said adapter comprising:

a casing, mountable to said cassette receiving station, having a track forming a substantially linear path for guiding a record card mounted therein;

means associated with said casing for selectively transversely adjusting a record card mounted in said casing track between a first condition in which a first recording track is registered with said transducer and a second condition in which a second recording track is registered with said transducer;

said casing track, when said casing is mounted on said machine, being aligned with said drive means and said transducer and having openings therein for receiving said drive means and said transducer permitting said drive means to move a record card in said casing track in an operative association with said transducer.

PLANT PATENTS

GRANTED MARCH 22, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,023

GOLDEN BOSTON FERN

Robert O. Miller, P.O. Box 120, Smith River, Calif. 95567

Filed Mar. 10, 1976, Ser. No. 665,811

Int. Cl.[2] A01H *9/00*

U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct variety of Boston fern having the characteristics of Boston fern but differing in that it is yellow to golden color, and has a growth rate approximately 60 percent that of Boston fern.

4,024

PLUM PLANT

Ronald Paul, 5485 E. Heaton, Fresno, Calif. 93727

Filed Dec. 10, 1975, Ser. No. 639,261

Int. Cl.[2] A01H *5/03*

U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum substantially as illustrated and described, which is generally similar to the Casselman plum but is distinguishable therefrom primarily by its fruit having a noticably lighter bloom, giving the skin a brighter, darker red color, and by its fruit ripening 3 to 5 days earlier, and being slightly larger and more oblong.

4,025

ROSE PLANT

Marilyn R. Lemrow, Farmingville, N.Y., assignor to F. Harmon Saville, Rowley, Mass.

Filed Apr. 22, 1976, Ser. No. 679,146

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of rose plant of the miniature class, substantially as shown and described, characterized particularly by recurrent flowers of rose pink coloring aging to a lighter lavender pink coloring with cream colored center and reverse marking highlighting the open bloom; in large conically shaped clusters of about 7 to 12 blooms per cluster on a vigorous but compact growing plant with abundant foliage and few thorns.

PLANT PATENTS

Illustrations for plant patents are usually in color and must be filed in the U.S. Art Unit before the application can be assigned a filing date.

No. PP3,135

BOTANICAL RECORD CARD ADAPTER FOR RECORD BOOKS

Filed Mar. 19, 1976, Ser. No. 668,283

1 Claim

PATENTS

GRANTED MARCH 22, 1977

ERRATA

For CLASS	See PATENT NO.
403–408	4,012,884
403–408	4,012,885
350–096 C	4,013,000
250–343	4,013,260
250–453	4,013,261
250–492 A	4,013,262
252–415	4,013,546
526–245	4,013,627
424–263	4,013,659
428–412	4,013,696
423–575	4,013,780
423–579	4,013,781
423–613	4,013,782
423–622	4,013,783
423–490	4,013,796
536–064	4,013,820
536–088	4,013,821
358–263	4,013,827
358–133	4,013,828
358–299	4,013,829
358–128	4,013,830
358–299	4,013,831
358–212	4,013,832
358–111	4,013,833
358–166	4,013,834
340–199	4,013,911
361–049	4,013,924
361–018	4,013,925
361–115	4,013,926
361–119	4,013,927
361–380	4,013,928
361–357	4,013,929
361–172	4,013,930
361–187	4,013,931
329–104	4,013,967

PATENTS

GRANTED MARCH 22, 1977

ERRATA

CLASS	PATENT NO.
403–408	4,012,884
403–408	4,012,885
350–096 C	4,013,000
250–343	4,013,290
250–453	4,013,297
250–492 A	4,013,342
252–413	4,013,546
235–245	4,013,627
424–263	4,013,659
428–413	4,013,659
423–575	4,013,780
423–579	4,013,781
422–613	4,013,782
422–622	4,013,783
427–160	4,013,790
356–064	4,013,820
356–058	4,013,821
358–263	4,013,827
358–131	4,013,853
358–299	4,013,859
358–124	4,013,830
358–299	4,013,871
358–212	4,013,882
358–111	4,013,813
278–196	4,013,834
360–199	4,013,911
361–049	4,013,924
361–018	4,013,923
361–115	4,013,925
361–179	4,013,927
361–180	4,013,928
361–177	4,013,929
361–172	4,013,930
361–187	4,013,931
329–104	4,013,907

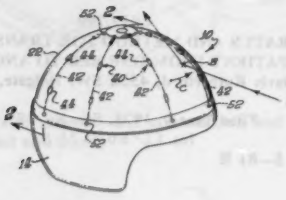
PATENTS

GRANTED MARCH 22, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

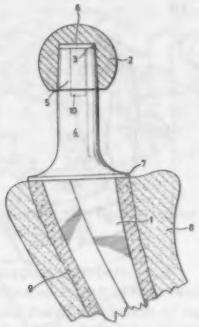
4,012,794
IMPACT-ABSORBING HELMET
Tetsuo Nomiyama, 1526 Century, Santa Ana, Calif. 92703
Filed Aug. 13, 1975, Ser. No. 604,358
Int. Cl.² A42B *1/08*
U.S. Cl. 2—411 **7 Claims**



1. An impact-absorbing helmet comprising:
an inner, substantially-stationary, shell member;
a base member integrally formed as the lower, protective portion of said helmet;
an outer shell member rotatably supported on said inner shell and superposed thereover, said outer shell having an annular free edge;
means for attaching said outer shell to said inner shell about the central, vertical axis of said helmet;
pivot means disposed between said outer and inner shells in alignment with said vertical axis, whereby said outer shell freely rotates about said inner shell;
bearing means interdisposed between said outer and inner shells;
wherein said bearing means includes;
a first bearing means disposed between said outer and inner shell members, and annularly positioned about said attaching and pivot means; and
a second bearing means disposed between said outer and inner shell members, wherein said second bearing means comprises a plurality of bearing units equally spaced apart in a side-to-side relation to each other, and wherein each bearing unit is arranged perpendicular to said base member; and
means to stabilize the rotational movement of said outer shell with respect to said inner shell, said means being formed between said outer shell and said base member.

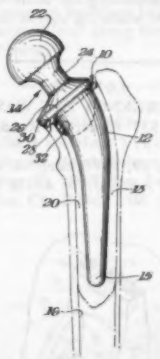
4,012,795
ARTIFICIAL HEAD ASSEMBLY FOR AN ARTICULATED JOINT BETWEEN TWO BONES
Erhard Dörre, Plochingen, Germany; Manfred Semlitsch, and Otto Frey, both of Winterthur, Switzerland, assignors to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung, Germany
Filed Oct. 29, 1975, Ser. No. 626,733
Claims priority, application Germany, Oct. 29, 1974, 2451275
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **9 Claims**

1. An artificial head assembly for an articulated joint between two bones comprising:
a. an elongated pin member having a conically tapering longitudinal end portion of metallic material; and
b. a head portion of ceramic material having a substantially spherical, convex engagement face and formed with a blind bore conically tapering inward of said head portion at an apex angle substantially identical with the apex angle of said tapering end portion,
1. said ceramic material and said metallic material directly engaging each other in a conically tapering interface extending over more than one half of the axial length of said bore,
2. said head portion being fixedly fastened to said pin member by said engaged materials,



3. one of said materials having a surface layer contiguously adjacent said interface and a main portion separated from said interface by said surface layer,
4. the resistance to deformation of said surface layer being smaller than the resistance to deformation of said main portion.

4,012,796
INTERPOSITIONING COLLAR FOR PROSTHETIC BONE INSERT
Sidney Weisman, West Caldwell, and Robert F. Cotter, Sparta, both of N.J., assignors to Howmedica, Inc., New York, N.Y.
Filed Sept. 24, 1975, Ser. No. 616,297
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **10 Claims**



1. An interpositioning collar for disposition between a metal prosthetic bone implant having a stem and adjacent portions of the bone comprising a substantially flat collar element having a substantially central hole adjacent the inner periphery of the collar through which the stem of the metal implant is inserted, a substantially short flange depending adjacent the inner periphery of the collar for disposition between the adjacent portions of the stem and bone, the interpositioning collar being resilient and having a relatively low modulus of elasticity for firmly wedging the metal implant within the bone and absorbing shocks therebetween, the collar element is substan-

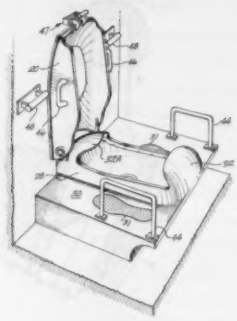
tially elongated in plan view, and the flange is substantially U-shape with an open end, and the open end being disposed adjacent one of the ends of the collar element.

4,012,797

SITTING-SQUATTING WATER CLOSET

Bjorn R. Kristoffersen, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 3, 1976, Ser. No. 663,587
Int. Cl.² E03D *11/00*
U.S. Cl. 4—10 **22 Claims**



1. A dual function water closet for use in either the sitting or the squatting position, comprising: a fixed lower section and a movable upper section foldable thereon; said lower section comprising a closet bowl being elongated in a fore and aft direction; said upper section comprising a toilet set hinged to the aft portion of the closet bowl and being in abutment sealing relationship with the sides of the elongated closet bowl when moved to the down position for use in the sitting position; a footrest fixed to each side of the closet bowl for support of the user in the squat position; said closet bowl having the level of its interior bottom surface below the horizontal plane of the side footrests; a urine spray shield at the forward end of the closet bowl; and said urine spray shield having an outer upper surface which nestles under the forward undersurface of the toilet seat for deflecting the urine of the user into the body of the closet bowl when the user is facing in the forward direction.

4,012,798

PORTABLE EMERGENCY EYE WASH FOUNTAIN

John R. Liautaud, 1537 Churchill Road, Schaumburg, Ill. 60172

Filed Sept. 29, 1975, Ser. No. 617,837
Int. Cl.² A47K *3/18;* **A61H** *35/00*
U.S. Cl. 4—166 **13 Claims**

1. An emergency safety eye wash fountain comprising spray nozzle means positioned at a location for spraying the eyes of a worker and comprising:

a portable, unitary housing;

said housing having wall means defining an unpressurized liquid reservoir in said housing;

said nozzle means being located in said wall means in immediate fluid communication with said reservoir;

said resevoir being located gravitationally above said nozzle means; and

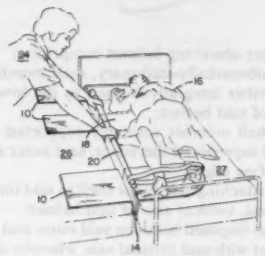
quick-release valve means for opening said nozzle means for instantaneous initiation of a continuing, drenching flow of eye wash liquid from said reservoir.

4,012,799

APPARATUS AND METHOD FOR TRANSFERRING A PATIENT FROM ONE BED TO ANOTHER

Gaery Davis Rutherford, 4522 SW. Holgate, Seattle, Wash. 98116

Filed June 9, 1975, Ser. No. 585,104
Int. Cl.² E03D *11/10*
U.S. Cl. 5—81 R **10 Claims**



1. An apparatus for transferring a patient from one bed to another, comprising:

an elongated bar having a length greater than half the height of said patient; and

a plurality of sled boards spaced apart along the length of said patient adjacent said bar, each of said boards including a planar support surface having a length sufficient to extend from one side of said patient to the other side of said patient with one end of said support surface terminating in a releasable bar securing portion curving upwardly and then toward said support surface, the curve of said securing portion being adapted to conform to the periphery of said bar such that when the support surfaces of said boards are placed beneath said patient and said securing portions are engaged by said bar, forces exerted on said bar away from said patient simultaneously slide said boards from one bed to another.

4,012,800

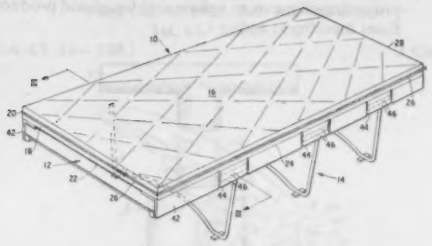
BEDS

Harry Mitchell, 3 Laurel Ave., Euxton, near Chorley, Lancashire, and William Augustine May, 640 Preston Road, Clayton-le-Woods, Chorley, Lancashire, both of England

Filed July 15, 1975, Ser. No. 596,128
Int. Cl.² A47C *19/00;* **A47G** *9/00*
U.S. Cl. 5—187 **18 Claims**

1. A bed comprising a rectangular cover assembly including two superimposed sheets of material joined or securable together at one end and along the adjacent two sides thereof to form a bag which is open at the opposite end thereof, a resilient mattress on which said cover assembly is positioned, a frame on which said mattress is supported, and fastening means connected between said cover assembly and said frame, said fastening means at least partially enclosing said

mattress and being maintained in tension at least partially by the resilience of said mattress to resist relative movement



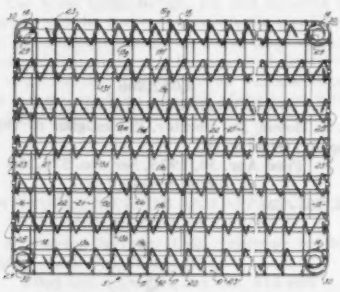
between said cover assembly and said mattress and between said mattress and said frame.

4,012,801

BOX SPRING ASSEMBLY

John Thomas King, Sarcoxie; Blondie Butler, Carthage, both of Mo., and Francis R. Struewing, deceased, late of Carthage, Mo. (by Barbara C. Struewing, administratrix), assignors to Legget & Platt Incorporated, Carthage, Mo.

Filed Oct. 10, 1975, Ser. No. 621,497
Int. Cl.² A47C *23/02*
U.S. Cl. 5—247 **13 Claims**



1. A box spring assembly for use in supporting a bed mattress, said assembly comprising

a rectangular base frame located in the bottom plane of said box spring assembly,

a plurality of slats extending between two opposite sides of said base frame,

a rectangular border wire generally overlying said base frame, said border wire being located in a plane spaced from but parallel to the plane of said base frame,

a grid of wires located in the plane of said border wire and defining the top plane of said box spring assembly, said grid comprising a plurality of longitudinal and transverse wires welded together at their intersections and secured at their opposite ends to said border wire, and

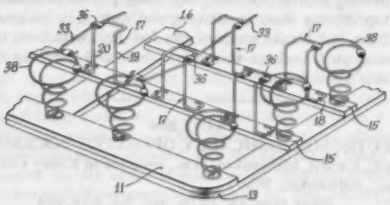
a plurality of parallel spiral spring wires extending between opposite sides of said base frame, said spiral spring wires being secured at the bottom to said slats and at the top to said wire grid.

4,012,802

MATTRESS FOUNDATION

Ronald G. Hutchinson, Naperville, and Paul J. Dillon, Frankfort, both of Ill., assignors to Simmons Company, Atlanta, Ga.

Filed Nov. 28, 1975, Ser. No. 636,090
Int. Cl.² A47C *23/00, 23/02*
U.S. Cl. 5—247 **11 Claims**



1. A foundation in the nature of a bedspring for supporting a mattress, comprising

a base;

a plurality of spaced support members

each comprising a continuous length of wire bent to provide two spaced, straight, and parallel columns of equal height,

an integral foot for each column defining a plane perpendicular to its column, and

an integral connection between the tops of the columns providing at the top of each column a length of supporting wire parallel to the plane of said feet;

tie wires extending between and secured to the spaced support members at their tops to assemble them into a mutually bracing, planar, rectangular supporting grid parallel to and spaced above the base;

a row of springs substantially the height of said columns secured to the base along each of its side edges and flanking the assembly of said support members; and

an overlying deck member coextensive with and supported by said assembly of wire support members and said flanking rows of springs, and serving to distribute localized loads applied to said foundation by an overlying mattress;

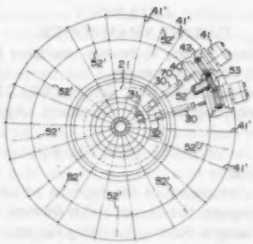
said foundation being substantially rigid and unyielding to normal bedding loads in the area of its upper surface overlying said support members but resiliently deflectable under concentrated load along the edges of said surface overlying said springs.

4,012,803

MULTIHEADED RADIAL TYPE NUT TAPPER

Yuan Ho Lee, 85 Jen Ho Road, Tainan, China /Taiwan

Filed Dec. 29, 1975, Ser. No. 644,941
Int. Cl.² B23G *1/08, 1/20*
U.S. Cl. 10—132 **5 Claims**



1. A multiheaded radial type nut tapper comprising:

a driving shaft adapted to be driven in rotary motion;

a cam provided on said driving shaft;

a plurality of push rods disposed radially about said cam and adapted to be driven by said cam in reciprocating motion thereby;

means for feeding nut blanks to a position in front of each of said push rods;

a plurality of tap driving shafts disposed radially about the driving shaft, each having its respective rotational axis aligned with an axis of one of said push rods; and

a plurality of bent taps adapted for rotation with said tap driving shafts, one bent tap being provided within each tap driving shaft so that tapped nuts may be produced from nut blanks successively fed onto said bent taps by said push rods as said drive shaft and said tap driving shafts are rotated.

4,012,804

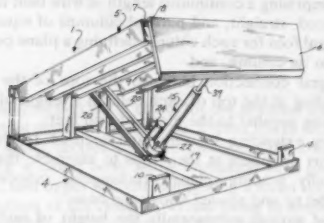
ELECTROMECHANICALLY OPERATED DOCKBOARD

John C. Catlett, Milwaukee, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.

Filed June 24, 1976, Ser. No. 699,469

Int. Cl.² E01D *1/00*

U.S. Cl. 14—71.3 **18 Claims**



1. In a dockboard construction to be associated with a loading dock, a supporting structure mounted on the dock, a ramp structure hinged at its rear end to the supporting structure and disposed to pivot from a generally horizontal cross traffic position to an upwardly inclined position, a drive unit interconnecting the supporting structure and the ramp structure for pivoting the ramp from the cross traffic position to the upwardly inclined position, said drive unit including a screw member and a nut member connected with the screw member, a first of said members being connected to the supporting structure and the second of said members being connected to said ramp structure, and a motor operably connected to the drive unit and being capable of being driven in one direction by a power source to effect relative movement between said nut member and said screw member to thereby move the ramp from the horizontal position to the upwardly inclined position, and said motor being driven in the reverse direction as the ramp structure descends by gravity from the inclined position toward the horizontal position to provide a dynamic braking action to control the descent of the ramp structure.

4,012,805

CARPET SHAMPOOER

Helmut Schneider, Mainz, Germany, assignor to Werner & Mertz GmbH, Mainz, Germany

Filed Apr. 28, 1976, Ser. No. 681,213

Claims priority, application Germany, Apr. 29, 1975, 2518941

Int. Cl.² A47L *11/34*

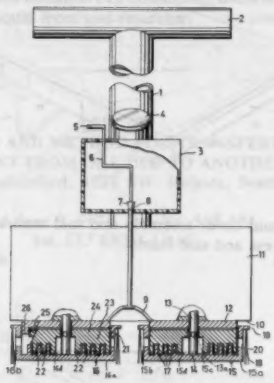
U.S. Cl. 15—50 R **14 Claims**

1. A carpet shampooer of the type in which at least one rotating brush engages the carpet and is formed with upwardly open cup enclosing a foam-generating device, the improvement wherein said foam-generating device comprises:

an array of upwardly projecting elements formed on the bottom of said cup for entraining a shampooing liquid and foam generated therefrom upon rotation of said brush;

a nonrotating body received in said cup and formed with downwardly extending baffle elements, said baffle elements including:

lower baffle surfaces cooperating with said upwardly projecting elements to agitate said liquid and produce a foam therefrom, and



upper baffle surfaces for directing a dry foam generated in said cup and rising therein outwardly, said cup being formed with an opening for discharging said dry foam; and

retaining means engaging said body for preventing rotation thereof while guiding said body floating in said cup so that said body rests upon said cup at least under its weight, said body being received with play in said cup.

4,012,806

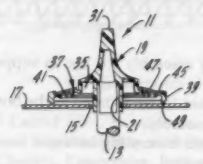
KNOB WITH DEFORMABLE WEB

Robert K. Howie, Jr., Decatur, Ill., assignor to The Grigoleit Company, Decatur, Ill.

Filed Apr. 30, 1975, Ser. No. 573,260

Int. Cl.² E05B *1/00*

U.S. Cl. 16—121 **10 Claims**



1. A knob for mounting on the end of shaft, said knob including:

a hub having an operating handle portion and a shaft receiving socket,

a web extending from said hub and terminating in a rim,

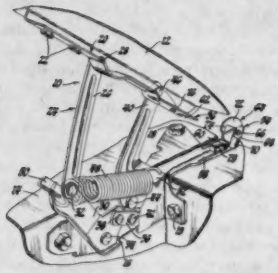
said web being sufficiently deformable to permit said operating handle portion and said shaft receiving socket to be moved axially relative to said rim, and

an annular dial supported cantileverly on said rim and extending over substantially all of said deformable web.

4,012,807
VEHICLE BODY HOOD HINGE

Otto Andrew Kern, Lansing, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 6, 1975, Ser. No. 619,613
Int. Cl.² E05D *1/00*
U.S. Cl. 16—128.1 3 Claims

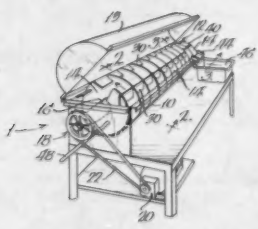


1. A vehicle body hood hinge comprising a body hinge member adapted to be mounted on a vehicle body adjacent the rear end of a forward engine compartment thereof, a hood hinge member adapted to be mounted on the rear end of a hood for closing the upper side of the engine compartment, means connecting the body and hood hinge members for movement relative to each other between hood open and closed positions, the hood hinge member including a generally planar flange defining a rearwardly opening slot and having an aperture formed therein adjacent said slot, the body hinge member including a generally planar flange oriented in a generally vertical plane and defining a forwardly opening notch, and a lock arm pivotally mounted on the body hinge member and including a striker end and a pawl end, movement of the hinge members to closed position moving the hood hinge flange to a generally horizontal orientation and the flanges into an interreceived relationship wherein the notch receives the hood hinge flange, the slot receives the body hinge flange, and the aperture receives the pawl end only in the event of an impact causing the hood hinge flange to pivot the striker end rearwardly and the pawl end downwardly into the aperture, thereby limiting forced vertical, lateral, and rearward movement of the rear end of the hood with respect to the vehicle body.

4,012,808
CONTINUOUS METHOD AND APPARATUS FOR MARINATING POULTRY

William K. Strong, Solvang, Calif., assignor to Restaurant Technology, Inc., Oak Brook, Ill.

Filed Oct. 15, 1974, Ser. No. 514,669
Int. Cl.² A22C *21/00*
U.S. Cl. 17—1 R 7 Claims

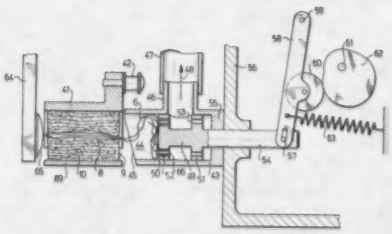


1. A continuous marinator assembly comprising an elongate trough and a continuous screw conveyor in said trough, said screw conveyor having a central hub and a plurality of flights spirally secured to said hub, a plurality of lifting vanes and at least one lifting vane positioned between each adjacent pair of flights and extending inwardly and rearwardly with respect to the direction of rotation of said screw conveyor from the peripheral edges of said flights to lift and to drop poultry pieces disposed between said flights, discharge vanes at one end of said screw conveyor for lifting poultry pieces upwardly, said discharge vanes extending inwardly from the periphery of at least one pair of adjacent flights and inclining forwardly in a direction opposite from the direction at which the lifting vanes are inclined, a discharge chute at one end of said trough adjacent the end of the screw conveyor mounting the discharge vanes for receiving poultry lifted by the discharge vanes, and in which said lifting vanes extend rearwardly at an angle of from about 45 to about 60 degrees from a plane including the outer edges of the vanes and the axis of said hub, the peripheral edges of said flights and said lifting vanes being positioned closely adjacent said trough whereby neither the flights nor said lifting vanes are likely to cut into poultry pieces disposed in said marinator assembly.

4,012,809
METHOD AND APPARATUS FOR ATTACHING THE FREE END OF A WITHDRAWING TAPE TO A TAMPON ROLL

Niels Warnecke, Metzkausen, and Wolfgang Johst, Gevelsberg, both of Germany, assignors to Dr. Carl Hahn GmbH, Dusseldorf, Germany

Division of Ser. No. 408,215, Oct. 19, 1973, Pat. No. 3,946,463. This application Apr. 25, 1975, Ser. No. 571,454
Claims priority, application Germany, Oct. 30, 1972, 2253180
Int. Cl.² A61L *15/00*
U.S. Cl. 19—144.5 5 Claims

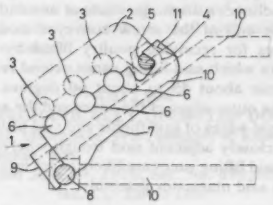


1. In an apparatus for winding a batting strip into a tampon batting roll wherein one end of a withdrawing tape is joined to said batting strip and the other end of said tape is free, and wherein said apparatus comprises a rotatable, forked winding mandrel having fork tines, said mandrel adapted to be positioned adjacent to the longitudinal side of said batting strip which bears the free end of the withdrawing tape with said fork tines straddling said longitudinal side whereby said strip is wound into said roll by rotating said mandrel about an axis perpendicular to said longitudinal side of said strip, the improvement wherein said mandrel is provided with an axial bore therethrough having a first open end adapted to be positioned adjacent to said longitudinal side and a second open end in flow communication with a source of vacuum whereby said free end of said withdrawing tape may be aspirated into said bore when winding said strip.

4,012,810
DRAWING SYSTEM ARRANGEMENT FOR SPINNING MACHINES

Hans Stahlecker, Sussen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, both of, Germany

Filed Apr. 25, 1975, Ser. No. 571,852
Claims priority, application Germany, May 9, 1974, 2422422
Int. Cl.² D01H 5/56
U.S. Cl. 19—294 **9 Claims**

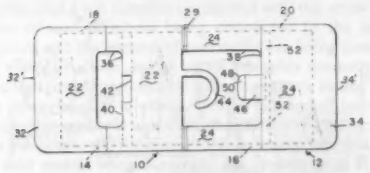


1. A drawing system for spinning machines which include a machine frame, the drawing system including top rollers and bottom rollers, arm means for carrying and loading the top rollers, a carrying rod connected to said arm means, at least two dies arranged on and connected with said carrying rod for supporting the bottom rollers, a die carrier arranged on the machine frame in a supporting relationship with said dies, said carrying rod having a length which is at least twice the distance between two adjacent dies arranged on the carrying rod, and means for directly attaching said carrying rod to the machine frame such that a surface portion of the carrying rod directly engages a surface portion of the machine frame.

4,012,811
MOLDED PLASTIC CLAMP

Joseph Mazzaferro, 325 Hamilton St., Leominster, Mass. 01453

Filed Jan. 21, 1976, Ser. No. 651,058
Int. Cl.² A44B 21/00
U.S. Cl. 24—84 H **3 Claims**

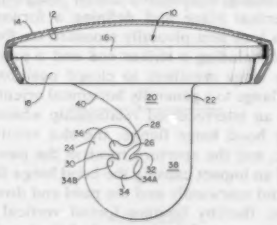


1. A one-piece molded clamp having a pair of articulated clamping elements of rectangular configuration, each of said elements having a pair of parallel opposite sides, one end edge along which the element is integrally joined to a corresponding edge of the other clamping element and a free end edge opposite and parallel to said one end edge which contacts a corresponding free end edge of the other clamping element when the clamp is closed to provide an article grip, each of said clamping elements also having a pair of inclined flat portions defining outer faces joined to each other along a transverse ridge line intermediate said one end edge and said free end edge and a pair of triangular parallel side flanges bordering the opposite sides of and normal to the clamping element, each of said triangular flanges having a pair of side edges which form the side edges along one side of said inclined flat portions and which form an apex on said ridge line and a base edge extending between said one end edge and said free end edge of the element on which it is formed, flexible hinge means joining said clamping elements along their one end edge for swinging one of said clamping elements relative to the other about said one end edge thereof from an open position wherein said elements extend outwardly from each other in opposite directions with the base edges of said flanges lying in a common plane to a closed position wherein said base edges of said flanges on the same side of the clamping element abut each other, a separate aperture formed in each of said clamping elements, the aperture in one of said clamping elements being formed between the ridge line and the one end edge thereof and the other clamping element having a supporting hook integral wherewith and extending from said one end edge thereof into the aperture of said one clamping element when said element is open and which when the clamp is closed extends outwardly therefrom in a substantially medial plane between the clamping elements, the aperture in the other clamping element being spaced from said one end thereof, a latch integral with one of the clamping elements and a latch keeper integral with the other clamping element for holding the clamp in closed position with an article therebetween, said latch comprising an angular tongue extending from said one clamping element toward the aperture in the other clamping element and said latch keeper comprising an edge of the aperture in the other clamping element, said angular tongue having an undercut thereon for snapping past said latch keeper and being retained thereby.

4,012,812
DOUBLE LOCK TUFTING BUTTON

Stanley D. Black, Malden, Mass., assignor to Wade Industries, Inc., Malden, Mass.

Filed Mar. 11, 1976, Ser. No. 665,962
Int. Cl.² A44B 1/22, 1/18
U.S. Cl. 24—90 B **6 Claims**



1. Tufting button comprising, a collet with a base disc and twine loop hook with first and second series array twine locks therein, the first lock being comprising a hook edge opposing a low stem portion of the hook and the second lock comprising symmetrically arranged opposing lips defining a locking opening therebetween overlying a cavity with symmetrically arranged return recesses under the lips on both sides of the locking opening, the device further comprising a return recess between the locks opposing the second lock opening, the arrangement providing one way twine locking movement whereby the twine can first contact a portion of the stem near the base disc, then go through said first lock and then go through said second lock in one continuous forward motion.

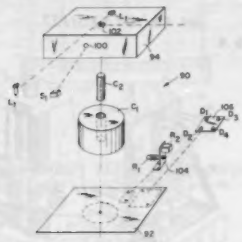
4,012,813
ANTI-THEFT FASTENING DEVICE AND TOOL FOR RELEASING SAME

Henry J. Martens, Lynnfield, and Jan Vandebult, Topsfield, both of Mass., assignors to I. D. Engineering, Inc., Peabody, Mass.

Division of Ser. No. 519,270, Oct. 30, 1974, Pat. No. 3,911,534. This application Apr. 14, 1975, Ser. No. 568,150
Int. Cl.² A44B 9/00; E05B 47/00; B66C 1/04; H01H 47/00
U.S. Cl. 24—150 R **5 Claims**

1. A detaching tool adapted to release a fastening device forming part of a separate and independent tag assembly for tagging articles, comprising:

a. a housing in the form of a detachable cover and a bottom plate;
b. a magnetic coil and core mounted on said plate;
c. switch means exposed exteriorly of said cover;
d. a source of alternating current, and
e. circuit means electrically interconnecting said switch means and said magnetic coil for energizing said magnetic



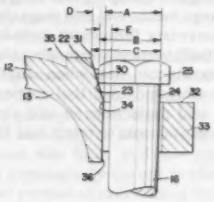
coil, said circuit means including a rectifying bridge and overload protection means for interrupting the circuit to said magnetic coil when said switch means has been closed a predetermined period of time, whereby when said fastening device is positioned adjacent said detaching tool and said switch means is closed, said magnetic coil is activated for releasing said fastening device.

4,012,814

HOSE CLAMP BODY

Paul D. Yoder, Willoughby, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Dec. 19, 1975, Ser. No. 642,476
Int. Cl.² B65D *63/00*
U.S. Cl. 24—284 **4 Claims**



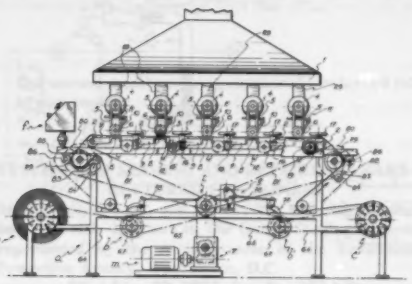
1. In combination, a hose clamp body having a surface thereon for gripping a hose and having a bolt opening therethrough and a first surface generally transverse to the axis of said opening, a bolt having a shank extending through said opening and having a head opposed to said first surface, said head having at least one flat side surface, said body having a second flat surface intersecting said first surface and extending from such intersection to an upper edge, said second body surface extending away from said first surface at an acute angle with respect to the longitudinal axis of said opening, the transverse distance when the shank is against the wall of the opening at a location opposite said second surface between the longitudinal axis of the bolt and said flat side surface being greater than the transverse distance between the longitudinal axis of the bolt and said intersection and lesser than the transverse distance between said longitudinal axis of the bolt and said upper edge whereby said second surface engages said bolt head side surface and wedges said shank against the wall of said opening at said location before said bolt head can engage said first transverse surface and said bolt is prevented from turning relative to said body by said engagement.

4,012,815

APPARATUS FOR ABRADING FABRICS

Jose Benzaquen, Caseros, Buenos Aires, Argentina, assignor to Benzaquen, Sociedad Anonima, Industrial, Comercial, Inmobiliaria y Financiera, Buenos Aires, Argentina

Continuation-in-part of Ser. No. 311,261, Dec. 1, 1972, Pat. No. 3,872,557. This application Feb. 5, 1975, Ser. No. 547,178
Int. Cl.² D06C *11/00*
U.S. Cl. 26—28 **20 Claims**



1. Apparatus for continuously conditioning fabric including means for moving the fabric through the apparatus with substantially negligible longitudinal tension, said means comprising rotating roll means at opposite ends of said apparatus, and means for varying the frictional contact between said roll means and the fabric so that such contact is greater at one end of the apparatus than at the other depending upon the direction of travel of the fabric through the apparatus, guide means for guiding said moving fabric through the apparatus, at least one fabric abrasion cylinder positioned transversely to the direction of movement of the fabric through the apparatus, drive means for rotating said cylinder about an axis transverse to the direction of movement of the fabric, and oscillating means for oscillating said cylinder in a direction transverse to the direction of movement of the fabric, said oscillating means oscillating said cylinder in response to the rotation thereof.

19. Apparatus for continuously conditioning fabric including means for moving the fabric through the apparatus, said means comprising rotating roll means at opposite ends of said apparatus, means for varying the frictional contact between said roll means and the fabric so that such contact is greater at one end of the apparatus than at the other depending upon the direction of travel of the fabric through the apparatus, guide means for guiding said moving fabric through the apparatus, at least one fabric abrasion cylinder positioned transversely to the direction of movement of the fabric through the apparatus, drive means for rotating said cylinder about an axis transverse to the direction of movement of the fabric, and oscillating means for oscillating said cylinder in a direction transverse to the direction of movement of the fabric, said oscillating means oscillating said cylinder in response to the rotation thereof.

4,012,816

METHOD AND APPARATUS FOR PROCESSING THERMOPLASTIC YARN

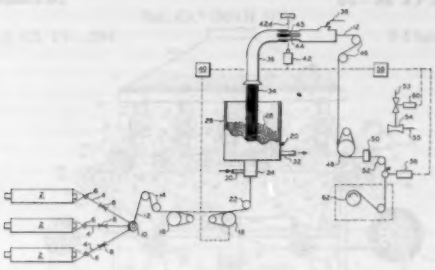
Charles S. Hatcher, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 405,520, Oct. 11, 1973, abandoned. This application June 2, 1975, Ser. No. 583,318
Int. Cl.² D02G *1/20, 1/12*
U.S. Cl. 28—1.3 **24 Claims**

20. Apparatus for processing thermoplastic yarn comprising
heating means for heating a yarn;
texturing means for texturing the heated yarn to produce a yarn plug, said yarn plug having an end from which the textured yarn is pulled;
temperature control means for maintaining the temperature of the heating means at or above a first set point;

monitoring means for monitoring the end of said yarn plug, the end of said yarn plug oscillating with respect to a predetermined point;

timing means for timing the interval for the end of said yarn plug to oscillate with respect to said predetermined point; and



means for changing the set point of the temperature control means from the first set point to a second set point if the interval for the end of said yarn plug to oscillate with respect to said predetermined point is equal to or longer than a fixed time period.

4,012,817

METHOD OF MAKING A CAPACITOR

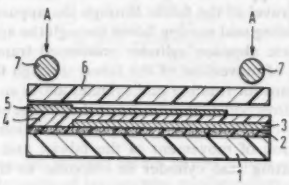
Karl-Heinz Preissinger, Taufkirchen, and Ulrich Wehnelt, Starnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 26, 1975, Ser. No. 590,432

Claims priority, application Germany, June 27, 1974, 2431044

Int. Cl.² H01G 4/18, 7/00

U.S. Cl. 29—25.42 3 Claims



1. A method for producing a layer type capacitor comprising the steps of

coating an adhesion-imparting layer in a dissolved state onto a first covering foil,

applying a first conductive layer with pores therein into the exposed surface of said adhesion-imparting layer, coating the exposed surface of the first conductive layer with a dielectric lacquer solution having a solvent therein, said adhesion-imparting layer being soluble in said solvent, allowing the solvent to penetrate through the pores of the first conductive layer to activate the adhesion layer, and applying a second conductive layer on said dielectric, applying a second covering foil and contacting said conductive layers on opposite sides by pressing heated leads at least at one point through said covering foil and the respective of said layers into said first covering foil.

4,012,818

BORING MILL AND MILLING DEVICE WITH A TOOL MAGAZINE

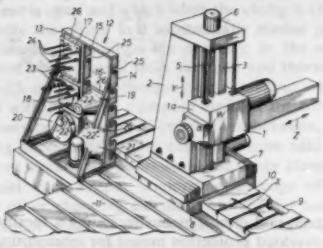
Jürgen R. K. Dornblüth; Gerd Engel, both of Rheydt, and Heinrich Klassen, Viersen, all of Germany, assignors to Scharmann & Co., Rheydt, Germany

Filed Nov. 14, 1974, Ser. No. 523,811

Claims priority, application Germany, Nov. 14, 1973, 2356799

Int. Cl.² B23Q 3/157

U.S. Cl. 29—26 A 13 Claims



1. A horizontal boring mill and milling device, which includes in combination: a horizontally displaceable stand, a tool carrier supported by and vertically movable on said stand for exchangeably receiving and supporting a tool for performing machining operations, a tool magazine comprising means for holding tools and tool sets in a position substantially parallel to their intended position in said tool carrier, and means for moving said stand relative to said magazine, said tool magazine being arranged laterally of and in a plane in front of said tool carrier and within the region of movement of said tool carrier, said tools and tool sets having supporting flange means for connecting to said tool carrier, said tool carrier being provided with means for picking up and receiving tools and tool sets from said magazine, clamping means on said tool carrier for positioning and clamping said flange means on said tool carrier, said flange means and said magazine having interengageable complementary formations including projections on one and substantially vertically extending slots in the other, said projections entering said slots when said flange means is positioned on said magazine, said tool carrier lowering said flange means with said projections in said slots so that said projections engage in said slots to retain said flange means on said magazine.

4,012,819

CYLINDRICAL ABRADING TOOL

Karl Willinger, Vienna, Austria, assignor to Firma Hans Ehgartner, Vienna, Austria

Continuation-in-part of Ser. No. 511,619, Oct. 3, 1974, Pat. No. 3,927,447. This application Sept. 8, 1975, Ser. No. 611,263

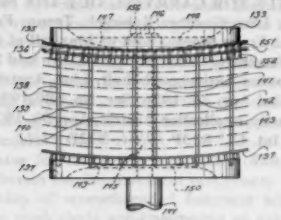
Claims priority, application Austria, May 10, 1974, 3890/74; Sept. 6, 1974, 7209/74

Int. Cl.² B23D 71/00

U.S. Cl. 29—79 7 Claims

1. An abrading tool comprising a cylindrical hollow body with a pair of coaxial apertured end disks, a multiplicity of tiers of annular cutting blades of sheet metal between said disks centered on the disk axis and provided with toothed outer edges projecting beyond the peripheries of said disks, mounting means holding said cutting elements sandwiched between said disks, and lugs integral with said cutting blades separating adjacent tiers with formation of a multiplicity of

generally radial passages communicating with the disk apertures for the circulation of cooling air through said body, said



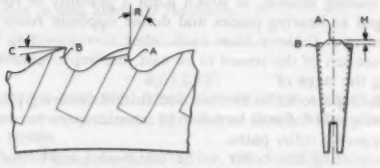
lugs lying in substantially radial planes perpendicular to a plane transverse to said axis.

4,012,820

CIRCULAR SAW HAVING TEETH WITH AN IMPROVED METAL BREAKING GEOMETRY

Robert H. Nowak, Mentor, Ohio, assignor to The Motch & Merryweather Machinery Company, Cleveland, Ohio

Filed June 16, 1975, Ser. No. 587,504
Int. Cl.² B26D *1/12, 1/00;* B23D *57/00*
U.S. Cl. 29—103 R 7 Claims



1. A circular saw having teeth with an improved metal cutting geometry comprising:

a circular saw blade body; and,

a plurality of saw teeth means attached to said saw blade body and separated one from another by gullet means, said saw teeth means including a plurality of higher and lower teeth arranged in a triple-chip like manner, said teeth means including at least a leading face and a first and a second side face, said saw teeth means further including a continuously curved working surface located on the upper portion of said leading face of said saw teeth means, said continuously curved working surface having two edge portions where said continuously curved working surface meets said first and second side faces and a central portion intermediate said two edge portions and advanced forward of said two edge portions.

4,012,821

ROLL SECTION AND MANUFACTURE OF SLEEVED ROLLER THEREWITH

Donavon L. Feaster, Mattapoisett, Mass., assignor to Mount Hope Machinery Company, Incorporated, Taunton, Mass.

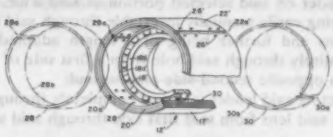
Filed July 11, 1975, Ser. No. 595,090
Int. Cl.² B21B *13/02*
U.S. Cl. 29—116 R 14 Claims

1. A roll section having a cylindrical spool and anti-friction rotational bearing means seated within the bore thereof, said roll section having the improvement comprising

A. at least first and second concentric and contiguous conjoined cylindrical members, the outer surface of said second member forming the spool outer surface,

B. bearing-locking means securing the bearing means within the inner surface of said first member, and

C. a non-overlapping seam axially extending along the length of each cylindrical member, said seams of said first



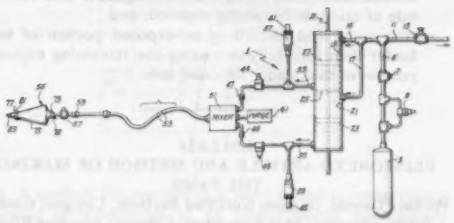
and second members being rotationally balanced relative to one another.

4,012,822

SYSTEM FOR SEALING AND REPAIRING LEAKS IN RUPTURED CONTAINERS

John J. Vrolyk, Simi, and Robert W. Melvold, Northridge, both of Calif., assignors to The United States of America as represented by the Administrator of the Environmental Protection Agency, Washington, D.C.

Filed May 29, 1975, Ser. No. 582,049
Int. Cl.² B32B *35/00*
U.S. Cl. 29—700 11 Claims



1. A system for sealing and repairing a rupture in a container, wherein the system comprises, in combination:

a. storage means for storing a sealant material,

b. displacement means for expelling the sealant material from the storage means,

c. an open-celled sponge body for inserting into the rupture, and

d. conduit means providing communication between the storage means and the sponge body for conveying the expelled sealant material into the sponge body to thereby seal and repair the rupture.

4,012,823

METHOD OF MAKING ARTIFICIAL INTRAOCULAR LENSES

William Richards, Medway, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Dec. 8, 1975, Ser. No. 638,489
Int. Cl.² B23P *17/00*
U.S. Cl. 29—418 8 Claims

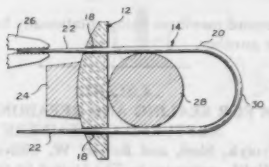
1. The method of securing iris clips to lenses of pseudophakoi wherein the iris clips are formed of wire and anchoring holes are provided in the lenses for receiving ends of the wires, said method comprising the steps of:

providing a wire having a substantially uniform preselected diametral size at least throughout a selected portion of its length to be secured to a lens, said selected portion having a first free end;

forming a hole in said lens of an appreciably smaller diametral size than the diametral size of said selected portion of said wire, the differential of diametral sizes of said hole and portion of said wire being sufficient to prevent accidental detachment of lens and wire following forceful interfitting thereof;

reducing the diametral size of a section of said selected portion of said wire adjacent said first free end to at least the diametral size of said hole to produce an integral leader on said selected portion of said wire, said leader being easily manually insertable through said hole in said lens and further being of a length adapted to extend entirely through said hole from a first side of said lens to an opposite second side and beyond;

directing said leader into and completely through said hole in said lens from said first side through said second side;



gripping said leader and forcing said portion of said wire of said preselected diametral size and said lens relative to one another into interference interfitted relationship, a substantial portion of said leader adjacent said second side of said lens becoming exposed; and

cutting away and discarding an exposed portion of said leader then forcefully retracting the remaining exposed portion of said leader into said hole.

4,012,824

REINFORCED ARTICLE AND METHOD OF MAKING THE SAME

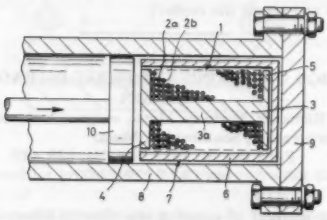
Walther Dawihl, Illingen; Gottfried Barthels, Cologne; Gustav Brühn, Opladen; Max Kittendorf, Cologne; Manfred Röper, Leichlingen; Heinz Scheuten, Bensberg-Immekeppel, and Oswald Schwerdtfeger, Cologne, all of Germany, assignors to Felten & Guilleaume Kabelwerke AG, Cologne, Germany

Continuation-in-part of Ser. No. 476,287, June 4, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,467

Claims priority, application Germany, June 6, 1973, 2328774

Int. Cl.² B23P *17/00*; B29H *9/02*

U.S. Cl. 29—419 R **60 Claims**



57. A method of making reinforced articles, comprising the steps of forming a primary blank member by overlaying at least one portion of a supporting member with uncoated reinforcing elements, said supporting member being composed at least in part of matrix-forming material for said elements; forming a secondary blank member by juxtaposing said primary blank member with another member which at least partially surrounds said initial blank member and which is composed at least in part of matrix-forming material; and applying pressure to said secondary blank member so as to form at least one reinforced article having a desired configuration.

4,012,825

METHOD OF EXCHANGING SUPPORTING OR DRIVING ROLLERS IN A CONTINUOUS CASTING PLANT AND APPARATUS FOR CARRYING OUT THE METHOD

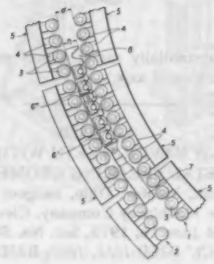
Fritz Gränitz, Linz; Gunther Robiczek, Traun; Fridolin Jabkowski, and Franz Stoger, both of Linz, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alphine Montan Aktiengesellschaft, Linz, Austria

Filed Apr. 26, 1976, Ser. No. 680,199

Claims priority, application Austria, Apr. 30, 1975, 3322/75

Int. Cl.² B23P *19/04*; B22D *11/12*

U.S. Cl. 29—427 **11 Claims**



1. In a method of exchanging rollers in a plant for continuously casting strands, in which plant a plurality of rollers is arranged in bearing places and define opposite roller paths located at a distance from each other corresponding to the cross-section of the strand to be cast, the improvement comprising the steps of

releasing a roller to be removed from its bearing place,

moving said roller to be removed into the space between the opposite roller paths,

transporting the roller to be removed longitudinally between the roller paths away from its bearing place,

transporting a roller to be installed longitudinally between the opposite roller paths toward a free bearing place, and

inserting the roller to be installed in the free bearing place.

4,012,826

BOLT TIGHTENING APPARATUS AND METHOD

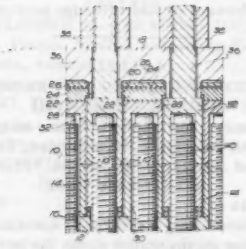
Fred Stansfield, Oldham, England, assignor to Doncasters Moorside Limited, Oldham, England

Filed May 19, 1976, Ser. No. 687,946

Claims priority, application United Kingdom, Mar. 18, 1976, 11006/76

Int. Cl.² B23P *11/02*; B25B *29/02*; E21B *19/00*

U.S. Cl. 29—446 **5 Claims**



1. A method of pre-tensioning a series of screwthreaded fasteners comprising an even number of such fasteners arranged on a commom pitch circle, the method including the steps of applying a tension to alternate fasteners of the series of fasteners by means of a ring member supported above the

remaining fasteners and by means of a plurality of piston and cylinder arrangements associated with said ring member and acting against respective spacer members surrounding said remaining fasteners tightening the nuts on the tensioned alternate fasteners to retain tension on said alternate fasteners, subsequently repositioning the ring member so that it can be supported above the already tightened fasteners and applying a tension to said remaining fasteners by means of said ring member and the piston and cylinder assemblies associated with said ring member, and tightening the nuts on the tensioned remaining fasteners to retain the tension on said remaining fasteners.

2. Apparatus for tensioning a plurality of screwthreaded fasteners, wherein the improvement comprises:

a. a plurality of screwthreaded fasteners arranged on a common pitch circle and comprising an even number of such fasteners;

b. first means coacting with each one of alternate fasteners for applying a tensile force to each of said alternate fasteners;

c. a ring member coacting with said first means and supported above the remaining fasteners to exert tensile forces on said alternate fasteners;

d. second means for maintaining said ring member in such coacting relation with said first means;

e. abutment means overlying respective remaining fasteners and disposed to support said ring member above said remaining fasteners; and

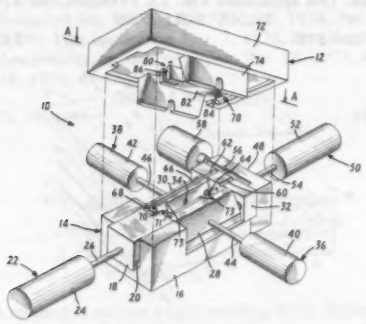
f. third means coacting with said ring member and with said abutment means and creating forces in said ring member that coact with said first means and thereby exert tensile forces in said alternate fasteners.

4,012,827

METHOD FOR MOLDING COMPOSITE ARTICLES

Gilbert Lawrence Abrams, 113 Helene Road, Valley Cottage, N.Y. 10989

Filed June 9, 1975, Ser. No. 584,828
Int. Cl.² B29F 1/14
U.S. Cl. 29—453 **7 Claims**



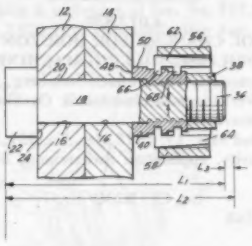
1. A method of forming a composite thick article from molded thin walled elements comprising the steps of injecting a molding material into a mold apparatus having at least two chambers with a separation therebetween, one of said chambers being in registration with the other said chambers, filling the chambers with said molding material to form a thin walled molded element in each of said chambers, providing during the formation of said elements, a plurality of projecting mating parts spaced from each other on each of said elements, the mating parts on one element extending outwardly toward and in registration with the mating parts on the other of said elements, removing the separation between said chambers to provide one chamber in unobstructed registration with the other of said chambers, while the elements are still in said chambers, driving said one element in substantially one direction toward said other element while still within said mold apparatus to join said mating parts thereby to form said composite article, and thereafter removing said composite article from said mold apparatus.

4,012,828

METHOD OF FASTENER ASSEMBLY FOR PRELOADING A JOINT

Warren F. Dahl, Philadelphia, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Division of Ser. No. 345,106, March 26, 1973, Pat. No. 3,920,338, which is a continuation-in-part of Ser. No. 285,906, Sept. 1, 1972, Pat. No. 3,803,793, which is a continuation of Ser. No. 28,377, April 14, 1970, abandoned. This application July 25, 1975, Ser. No. 599,279
Int. Cl.² B21D 39/00; B23P 11/00
U.S. Cl. 29—517 **4 Claims**



1. A method for assembling a joint assembly comprising a plurality of workpieces to be joined having substantially aligned openings therethrough and a fastener assembly including a fastener member having a head and a shank portion extending through said openings with the head adapted to engage the outer surface of one of said workpieces, and a free end of said shank portion projecting beyond the free surface of another one of said workpieces, the projecting part of said shank portion including an irregular surface configuration to provide a locking surface and to cooperate with a selectively reusable removably positioned abutment means, comprising the steps of:

placing a deformable collar member having an initially smooth surfaced internal bore about said projecting end of said shank portion so that one end of said collar member is adjacent the free surface of said another workpiece and the other end of said collar member is formed to initially bear on said abutment means;

snugging the joint assembly together to eliminate free play by advancing said abutment means on said free end of said shank portion so that said collar member bears on the free surface of said another workpiece and said abutment means initially bears on said other end of said collar member;

deforming said collar member radially inwardly toward said shank portion while said abutment means bears on said other end of said collar member, causing material of said collar member to extend radially inwardly into interlocking engagement with said irregular surface configuration and to extend axially against both said free surface of said another workpiece and said abutment means, axially elongating said collar member and said shank portion and preloading said joint assembly; and

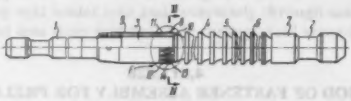
removing said abutment means from said free end of said shank portion, whereby the interlocking engagement between said collar member and said irregular surface configuration maintains preload in said joint assembly.

4,012,829

SHAPING-AND-CUTTING BROACH

Jury Ivanovich Dvorov, Yaroslavskoe Shosse, 8, korpus 2, kv. 614, and Vladislav Evgenievich Orlov, ulitsa Molostovykh, 1, korpus 2, kv. 157, both of Moscow, U.S.S.R.

Filed Mar. 5, 1976, Ser. No. 664,069
Int. Cl.² B26D 1/00
U.S. Cl. 29—567 6 Claims



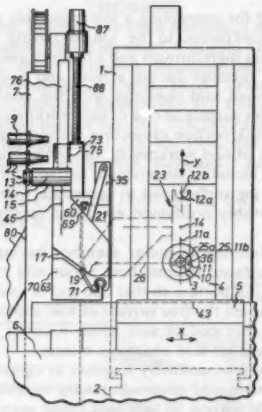
1. A shaping-and-cutting broach comprising: cutting teeth, each having a continuous cutting edge; gauging teeth; a shaping element located before said cutting teeth and provided with projections on the external surface which interacts with the machined surface in the course of broaching; said projections whose height is essentially greater than the total feed of said cutting teeth.

4,012,830

TOOL CHANGER FOR HORIZONTAL DRILLING-MILLING MACHINES

Norbert Ewertowski, Dietzenbach-Steinberg, Germany, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Mar. 17, 1975, Ser. No. 559,220
Claims priority, application Switzerland, Mar. 22, 1974, 4008/74
Int. Cl.² B23Q 3/157
U.S. Cl. 29—568 4 Claims



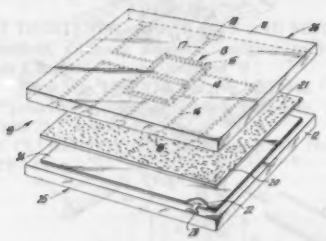
1. A horizontal drilling-milling machine comprising:
1. a machine frame;
2. a tool spindle horizontally mounted on said machine frame;
3. a magazine arranged adjacent said machine frame, said magazine having a plurality of tools arranged horizontally in said magazine and extending at right angles to said tool spindle, said tools being retrievable from said magazine and insertable in the tool spindle in a direction parallel to said tool spindle;
4. guide tracks arranged adjacent the magazine and parallel to said tool spindle;
5. a gripper carriage displaceably mounted for movement upon the guide tracks in a direction parallel to the tool spindle;
6. a tool changer means mounted on said gripper carriage for moving a tool from the magazine to the tool spindle and for moving a tool from the tool spindle to the magazine, said tool changer means comprising,
a. a gripper rocker mounted on said gripper carriage and swingable about a first axis parallel to said tool spindle,
b. means connected to said gripper rocker for swinging said gripper rocker about said first axis,
c. a gripper arm mounted on said gripper rocker and swingable about a second axis extending in spaced relationship from and at right angles to said first axis,
d. means connected to said gripper arm for swinging said gripper arm about said second axis,
e. a gripper vane mounted on said gripper arm, swingable about a third axis extending at right angles to said second axis, said gripper vane having tool gripping clamps mounted thereon,
f. means connected to said gripper vane for swinging said gripper vane about said third axis from a first position to a second position such that said gripper clamps are selectively positioned adjacent a tool in said magazine and adjacent said tool spindle;
7. cylinder and piston means for displacing said gripper carriage in different positions upon the guide tracks including,
a. a first cylinder secured to the gripper carriage for effecting tool change, said first cylinder having therein a first displaceable piston,
b. a second cylinder operatively connected with the guide tracks for displacing the gripper carriage during a work cycle, said second cylinder having therein a second displaceable piston,
c. a piston rod interconnecting said pistons with one another.

4,012,831

ELECTROCHROMIC DISPLAY ELEMENT AND PROCESS

Marshall Leibowitz, Englewood, N.J., assignor to Timex Corporation, Waterbury, Conn.

Division of Ser. No. 615,013, Sept. 19, 1975, Pat. No. 3,975,086. This application Apr. 23, 1976, Ser. No. 679,618
Int. Cl.² B01J 17/00
U.S. Cl. 29—570 2 Claims

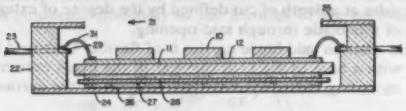


1. The process of making an electrochromic display which comprises the steps of:
providing a first substrate having transparent front electrodes and an electrochromic layer thereon,
providing a second substrate having a rear electrode,
providing an electroreactive layer for the rear electrode by:
a. heating an electrochromic material to a temperature ranging from 250° to 1,000° C,
b. passing hydrogen gas over the surface of the oxidized electrochromic material to impart hydrogen into the material,
filling the space between the substrates with an electrolyte, and,
sealing the first and second substrates together with an adhesive.

4,012,832
METHOD FOR NON-DESTRUCTIVE REMOVAL OF SEMICONDUCTOR DEVICES

John Reed Crane, Minnetonka, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Mar. 12, 1976, Ser. No. 666,522
Int. Cl.² B01J 17/00
U.S. Cl. 29—575 10 Claims



1. The method of bonding semiconductor devices to a substrate or base to enable their non-destructive removal and replacement, comprising the steps of:

providing a substrate having a conductive target pad thereon,

applying a first conductive plastic layer over said conductive target pad,

applying a conductive alloy chip over said first conductive plastic layer,

applying a second conductive plastic layer over said conductive alloy chip,

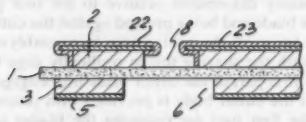
applying a semiconductor device over said second conductive plastic layer, and

curing said first and said second conductive plastic layer at a temperature below the melting point of said conductive alloy chip to provide a semiconductive device conductively bonded to said conductive target pad on said substrate.

4,012,833
METHOD OF MAKING DISPLAY STRUCTURE HAVING LIGHT EMITTING DIODES

Katsuhiko Akiyama, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

Division of Ser. No. 535,173, Dec. 23, 1974, Pat. No. 3,936,694. This application Nov. 7, 1975, Ser. No. 629,756
Claims priority, application Japan, Dec. 28, 1973, 48-3360; Nov. 21, 1974, 49-134643
Int. Cl.² B01J 17/00
U.S. Cl. 29—591 10 Claims



1. A method of making a light emitting diode display device having positive and negative electrodes comprising the steps of:

a. forming a first conductive metal layer on one surface of a substrate of insulating material;

b. forming a second conductive metal layer covering the other surface of said substrate;

c. forming a thin metal conductive layer on the surface of said second metal layer;

d. etching an opening through each of said metal layers, the openings being aligned with respect to each other;

e. the width of the opening in said second metal layer being narrower than the width of the opening in said first metal layer and the width of the opening in said thin metal layer being narrower than the width of the opening in said second metal layer;

f. the over hanging portions of said thin metal layer providing eaves extending partly over said second opening;

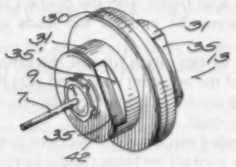
g. mounting the light emitting diode in said pair of aligned openings with its pn junction perpendicular to said substrate so as to bend down said eaves into said second opening; and

h. soldering said positive and negative electrodes with said eaves, respectively.

4,012,834
METHOD OF AND APPARATUS FOR AUTOMATIC PRODUCTION OF ARMATURES

Arnold P. LeVasseur, Lakeville, Minn., assignor to Possis Corporation, Minneapolis, Minn.

Division of Ser. No. 607,048, Aug. 22, 1975, Pat. No. 3,980,184, which is a division of Ser. No. 477,549, June 7, 1974, Pat. No. 3,920,129. This application Apr. 2, 1976, Ser. No. 672,867
Int. Cl.² H02K 15/02
U.S. Cl. 29—597 11 Claims



1. In apparatus for presenting articles which consist of assemblies of a number of components including a shaft upon which the other components are mounted, to a work station at which power actuated mechanism performs an operation upon the articles, the performance of which requires that the articles be presented to said mechanism in predetermined orientation with respect thereto, said apparatus including a plurality of identical carriers each having a cavity to receive one of said articles, and a circular periphery on which the carrier rolls with its axis horizontal down an inclined track to the work station, the improvement comprising:

A. rotation interrupting means on each carrier spaced from its axis of rotation and by which the carrier can be held in a predetermined position of rotation;

B. locating means on each carrier to engage said articles upon insertion thereof into its cavity and to establish the same in predetermined orientation with respect to the rotation interrupting means on the carrier;

C. holding means at the work station cooperable with said rotation interrupting means on the carriers to hold the carriers in a position of rotation in which the articles therein are in said predetermined orientation with respect to the power actuated mechanism at the work station;

D. an automatic assembling machine having instrumentalities to receive the individual components of said assembly and in progressive stages assemble the same into said articles with the shafts thereof vertical;

E. transfer means operable to grip and present the carriers one at a time and with their axes of rotation vertical, to a receiving station adjacent to said assembling machine;

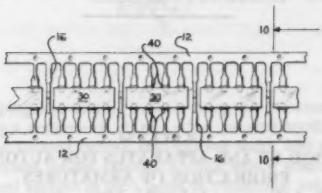
F. means to remove said assembled articles from the assembling machine and insert them into the carriers as the latter are presented to said receiving station; and

G. transfer means to grip the thus loaded carriers and deposit them on said track with their axes horizontal.

4,012,835
METHOD OF FORMING A DUAL IN-LINE PACKAGE

Charles W. Wallick, York, Pa., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Filed Sept. 17, 1974, Ser. No. 506,760
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976
Int. Cl.[2] H01L *21/28*
U.S. Cl. 29—591 7 Claims



1. The method of forming a dual in-line package from a unitary lead frame having spaced parallel carrier strips with groups of leads extending toward each other from the strips and rungs joining the strips between opposed groups of leads and a circuit module having opposed contact surfaces comprising the steps of:

A. Freely positioning a circuit module between adjacent rungs on the lead frame with the contact surfaces of the module adjacent the ends of the leads on the carrier strips;

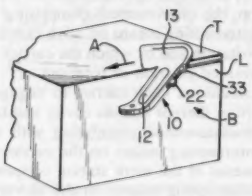
B. Moving the carrier strips toward the circuit module to foreshortened the adjacent rungs and seat the ends of the leads on both carrier strips against the contact surfces on the circuit module, and then;

C. Forming bonded electrical connections between the lead ends and the contact surfaces on the circuit module.

4,012,836
CARTON KNIFE

Richard I. Baer, Monson, and Kenneth M. Bellivue, Granly, both of Mass., assignors to Safe-T-Cut Incorporated, Palmer, Mass.

Filed May 30, 1975, Ser. No. 582,230
Int. Cl.[2] B26B *1/08, 5/00*
U.S. Cl. 30—2 4 Claims



1. Carton knife comprising,

means defining a hand holdable handle member with an extended length and an extended length hole therein with a forward opening,

means defining a blade carrier for moving along the length of said hole,

means for moving the carrier between and locking it in any one of a plurality of discrete positions along the length of said internal hole,

the said blade carrier means carrying a blade in position to extend forwardly through said hole forward opening in several of said plurality of positions and to be completely recessed within said hole in at least one of said positions,

the said hole and blade carrier further comprising cooperating guide means for rigidly mounting said blade and providing a smooth longitudinal passage track for said blade carrier within said hole, the forward part of the hole having a roof to prevent expansion of the carrier to a locking position,

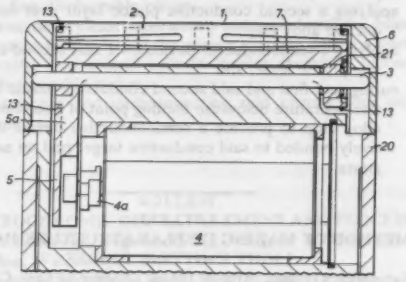
the said handle further comprising external guide means for bearing against two sides of a carton to define a uniform location of cut of a carton close to the edge of one of said sides at a depth of cut defined by the degree of extension of this blade through said opening,

and wherein said blade carrier is of flexible U-shaped form with a base of the U at the rear of the blade carrier and mounting means for the blade in front of the carrier.

4,012,837
DRY SHAVERS

Enzo Ascoli, Lausanne, Switzerland, assignor to The Gillette Company, Boston, Mass.

Filed June 23, 1975, Ser. No. 589,209
Claims priority, application United Kingdom, July 23, 1974, 32448/74
Int. Cl.[2] B26B *19/04, 19/12*
U.S. Cl. 30—43.9 11 Claims



1. In an electric shaver having a shaving foil which is removable from the shaver and a movable inner cutter cooperating therewith, wherein the inner cutter comprises a cutter body having slots therein and a plurality of cutter blades mounted in the slots, the improvement wherein each cutter blade comprises integrally formed first and second parts lying in a single plane, the first part having a cutting edge and the second part being resiliently deformable relative to the first part in the plane of the blade and being pressed against the cutter body to be deformed towards the cutting edge by assembly of the inner cutter beneath the shaving foil to resiliently urge the cutting edge of the first part of the cutter blade into engagement with the foil and the cutter body is provided with retaining means engaging the first part for retaining the blades in the slots when the shaving foil is removed from the shaver.

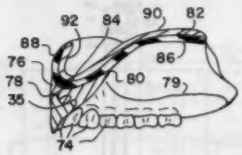
4,012,838
METHOD FOR PRODUCING ARTIFICIAL DENTURES

Joseph D. Abdenour, Grosse Pointe, Mich., assignor to American Denture Corporation, Scottsdale, Ariz.

Filed Jan. 30, 1975, Ser. No. 545,305
Int. Cl.[2] A61C *13/00*
U.S. Cl. 32—2 3 Claims

1. A method for producing a denture comprising: forming a generally U-shaped assembly of prosthetic teeth, bonding said U-shaped assembly of teeth into a generally u-shaped hard base structure; providing a terminus of said hard base structure disposed a short distance rearwardly of the incisor areas of said assembly of prosthetic teeth; bonding a soft deflectably formable layer onto said hard U-shaped base; inserting said hard U-shaped base and deflectably formable layer into a patient's mouth and finger forming said deflectably formable

layer into close proximity to the edentulous area of the patient's mouth; then removing said base and deflectably formed layer and placing a hardenable orally curable material in impressionable form on the soft deflectably formed layer; then unitarily reinserting the base and layer and curable material into the human individual's mouth and impression forming the curable impressionable material into impression conformance with said edentulous gum area of the patient's mouth and allowing the curable impressionable material to cure over the deflectably formable layer and bond thereto, to form a liner which conforms intimately to the features of the edentulous



gum area of the mouth, thereby forming a fitted denture module; then making a first impression model of one side of said fitted denture module; then making a second impression model of the opposite side of said fitted denture module; then removing the impressionable material and soft deflectably formed layer from the hard U-shaped base assembly of prosthetic teeth; then casting uncured denture base resin in a formable form between said second impression model and with said first impression model with the U-shaped hard base structure imbedded therein; and allowing said uncured denture base resin to cure in bonded relationship to said hard base structure to form said denture.

4,012,839

METHOD AND COMPOSITION FOR TREATING TEETH

William H. Hill, St. Paul, Minn., assignor to Peter Strong & Company, Inc., Portchester, N.Y.

Filed Nov. 26, 1973, Ser. No. 418,997

Int. Cl.² A61K *5/02*

U.S. Cl. 32—15 **16 Claims**

1. A method for treating mammalian dental tissue comprising the step of applying a bactericidal amount of a complex salt of silver thiocyanate in an orally acceptable form to said tissue.

4,012,840

ADHESIVE PIT AND FISSURE SEALANT

Mitsuharu Takeuchi, No. 26-19, 2-chome, Ichikawa, Ichikawa, Chiba, and Akira Otsuki, 833-22, Umadateba, Arakawaoki-cho, Tasuchiura, Ibaragi, both of Japan

Division of Ser. No. 508,733, Sept. 24, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,585

Int. Cl.² A61K *5/02*

U.S. Cl. 32—15 **1 Claim**

1. A method for preventing teeth from decaying by sealing pits and fissures of sound teeth, which comprises:

coating the surface of teeth with a mixture of a first material comprising a lower alkyl α-cyanoacrylate and ultramicrofine particles of silicon dioxide and a second material comprising a di-loweralkylformamide and then applying a third material of N,N-dimethyl-p-toluidine, N,N-dimethylaniline or N,N-diethylaniline onto the coated surface.

4,012,841

DEVICE FOR FIXING A DENTAL DRILL INTO A ROTOR

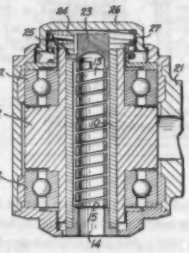
David Mosimann, Chemin des Grillons 13-15, Bienne, Switzerland

Filed Sept. 23, 1975, Ser. No. 616,023

Claims priority, application Switzerland, Sept. 30, 1974, 013157/74

Int. Cl.² A61C *1/10*

U.S. Cl. 32—27 **4 Claims**



1. In a dental handpiece having a rotor provided with an axial bore therein:

a helical spring in said bore, of an outer diameter slightly less than the diameter of said bore and having an inner diameter slightly less than that of the shank of a drill to be frictionally held and driven thereby;

driving means drivingly connecting one end of said spring to said rotor;

release means for selectively axially compressing said spring to thereby radially expand the same to release the shank of a drill therein;

said driving means comprising a top abutment member at one end of said spring having a notch drivingly receiving an end of said spring but permitting relative axial movement therebetween; and

said release means including an annular bottom abutment fixed in said bore and engaging the other end of said spring and an opening through said top abutment member for insertion of a tool to engage a drill frictionally held in said spring and thereby axially compress said spring against said annular abutment.

4,012,842

DENTAL TREATMENT METHOD AND APPARATUS

Jaroslav Vit, Belle Mead, N.J., assignor to National Patent Development Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 312,507, Dec. 6, 1972, Pat. No. 3,863,628, which is a continuation-in-part of Ser. No. 301,071, Oct. 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 301,074, Oct. 26, 1972, abandoned. This application Nov. 19, 1974, Ser. No. 525,258

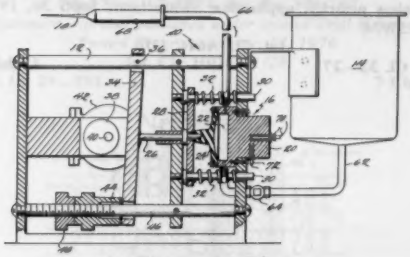
Claims priority, application United Kingdom, June 12, 1972, 27445/72; Aug. 24, 1972, 39588/72; Aug. 24, 1972, 39589/72; Aug. 24, 1972, 39590/72; Sept. 5, 1972, 41194/72

Int. Cl.² A61H *09/00;* **A61K** *07/16*

U.S. Cl. 32—58 **11 Claims**

1. The method of removal of dental debris including plaque or caries which includes supplying liquid to a chamber having a movable wall whereby the size of the chamber can be changed, forcing the liquid out the chamber as a pulsating high velocity jet stream and applying said stream to the plaque or caries of a tooth, causing said pulsations by changing the size of the chamber by cyclically first rapidly increasing the pressure on the movable wall to reduce the size of the chamber, then at the same rate and for the same period of time decreasing the pressure on the movable wall to again change the size of the chamber and then employing a motionless period in the cycle of no change in pressure wherein the volume of the chamber remains constant, said pulsations

being such that in each cycle the difference between the highest and lowest pressure applied to the dental debris, and the respective periods for which the dental debris in under



highest pressure and lowest pressure cause the dental debris to be mechanically stressed and then completely relaxed during a motionless period of substantially nil application of pressure to the teeth.

4,012,843

CONCAVE DIFFRACTION GRATING AND A MANUFACTURING METHOD THEREOF

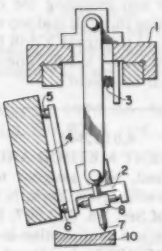
Tatsuo Harada, Fuchu; Shigeo Moriyama, Kokubunji; Toshiaki Kita, Tokyo, and Hidenori Yamaguchi, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 463,799, May 24, 1974, abandoned. This application Dec. 9, 1974, Ser. No. 531,156

Claims priority, application Japan, Apr. 25, 1973, 48-46175

Int. Cl.² B43L *13/24*

U.S. Cl. 33—19 A 7 Claims



1. A method of manufacturing a concave diffraction grating comprising the steps of:

a. providing a grating blank having a concave spherical surface;

b. positioning a ruling tool in a first plane intersecting said concave spherical surface and perpendicular to a line passing through the center of curvature of said concave spherical surface and a point at which the image of the first-order diffracted light of a predetermined wavelength λ_0 is formed stigmatically when said light emanates from the center of curvature of said concave spherical surface; and

c. passing said ruling tool back-and-forth across said concave spherical surface in a plurality of spaced-apart planes, each of said planes being parallel to said first plane and parallel to one another, and each of said planes intersecting said concave spherical surface, to thereby form a plurality of grating grooves in said concave spherical surface.

4,012,844

SIGHTING DEVICES FOR FIREARMS

Paul E. Tellié, St.-Etienne, France, assignor to Etat Francais, Paris, France

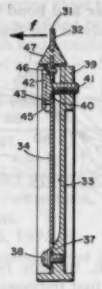
Filed May 20, 1974, Ser. No. 471,681

Claims priority, application France, June 1, 1973, 73.19955

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.² F41G *1/02*

U.S. Cl. 33—252 11 Claims



1. A firearm comprising a rear sight and a front sight, each of said rear sight and said front sight being mounted on an associated support having a fixed position with respect to the firearm, means for adjusting each of said sights, said adjusting means for one of said sights comprising a flexible, substantially vertically extending metal flat blade having a first end fastened to said support of said one sight and a second end firmly connected to said one sight, said one sight being an extension of said second end of said blade, and control means for varying the distance between an area of said blade and said support of said one sight so that the varying of this distance causes a displacement of the one sight.

4,012,845

DEHYDRATION PROCESS

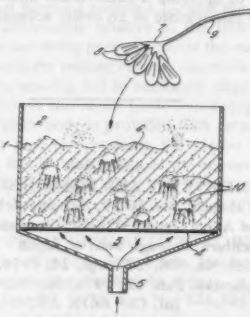
Francis John Judge, Rushden, and Joseph Morriss Stubbs, Bedford, both of England, assignors to N.V. Internationale Octrooi Maatschappij "Octropa", Rotterdam, Netherlands

Filed Dec. 8, 1975, Ser. No. 638,258

Claims priority, application United Kingdom, Dec. 16, 1974, 54268/74

Int. Cl.² F26B *3/00, 5/16*

U.S. Cl. 34—9 9 Claims



1. A process for the dehydration of a delicate object such as plant material, which process involves the steps of:

a. inducing relative motion between particles in a bed of dry particulate material selected from fine sand, silica gel and ion exchange resins;

b. immersing said delicate object in said bed while maintaining said relative motion at least in a zone which encompasses said delicate object; and

c. causing said relative motion to cease, so causing said

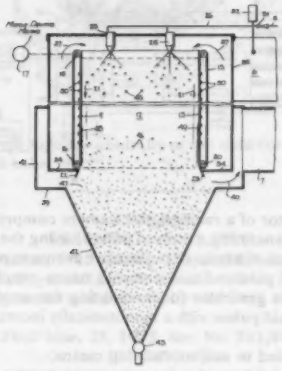
particulate material to hold said delicate object in a constant conformation while dehydration of said delicate object is effected.

4,012,846

APPARATUS FOR CONCENTRATING LIQUID-SOLID MIXTURE

Rene N. Silva, 555 Cliff St., Ridgewood, N.J. 07450

Filed July 28, 1975, Ser. No. 599,331
Int. Cl.² F26B *17/00*
U.S. Cl. 34—57 R **15 Claims**



1. Apparatus for separating liquid from a liquid-solid mixture which comprises a liquid having a solid therein, said apparatus comprising a first tube with a substantially peripherally continuous wall, solids scraping means engaging said wall for removing solids deposited on said wall, mounting means movably mounting one of said wall and said scraping means, driving means connected to said one of said wall and said scraping means for moving said one thereof, said tube having a first end and a second end spaced from said first end, spraying means at said first end of said tube for spraying said mixture in finely divided form into said tube and toward said second end, heated gas supplying means at one end of said first tube for supplying a flow of heated gas to the interior of said first tube at said one end and into contact with the sprayed mixture whereby said gas flows from said one end of said first tube to the other end thereof and mixes with said sprayed mixture, gas removal means at said other end of said first tube for removing said gas from said tube at said other end thereof as it reaches said other end, and solids receiving means at said second end of said first tube for receiving solids from within said first tube and solids removed from said wall by said scraping means.

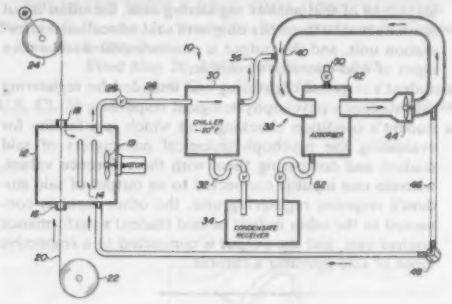
4,012,847

SOLVENT RECOVERY SYSTEM

Burton Rand, Norristown, Pa., assignor to Autosonics Inc., Norristown, Pa.

Filed Nov. 24, 1975, Ser. No. 634,400
Int. Cl.² F26B *21/06*
U.S. Cl. 34—75 **12 Claims**

1. A solvent recovery system comprising a housing defining a process chamber, said chamber having an inlet and an outlet and confining solvent vaporized from a work product as the product moves through the chamber, means for recovering vaporized solvent from said chamber in two stages, a chiller for removing a portion of said vaporized solvent and constituting the first stage, said chiller having an inlet communicating with said chamber, an air circulation system communication with an outlet of said chiller, said air circulation system including an adsorber which is the second stage for recovery of vaporized solvent, and means for causing air and vaporized



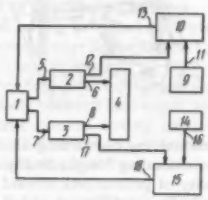
solvent to flow from said housing to said chiller and then to said air circulation system with the rate of flow from said housing to said chiller being at least 5 cfm but substantially less than the flow rate of said air circulation system.

4,012,848

AUDIO-VISUAL TEACHING MACHINE FOR SPEEDY TRAINING AND AN INSTRUCTION CENTER ON THE BASIS THEREOF

Elza Samuilovna Diament, Profsojuznaya ulitsa, 87, korpus 3, kv. 79; Sergei Viktorovich Kiselev, ulitsa Novatorov, 42, korpus 1, kv. 32; Vladimir Leonidovich Monin, ulitsa Metallurgov, 22/22, kv. 69; Vyacheslav Vyacheslavovich Petrusinsky, ulitsa Malaya Jushumskaya 8, korpus 2, kv. 51, and Vladimir Mikhailovich Pronin, ulitsa Chernyshevskogo, 21/25, kv. 3, all of Moscow, U.S.S.R.

Filed Feb. 19, 1976, Ser. No. 659,202
Int. Cl.² G09B *5/06*
U.S. Cl. 35—8 A **38 Claims**



1. An audio-visual teaching machine for speedy training, comprising:

an operator's console intended for switching various units and tutoring programs in a required sequence;

an educational information unit designed for playing back pre-recorded lesson information, instructions and service signals, with the input thereof connected to a respective output of said operator's console;

a student's performance control unit which is a facility for playing back signals to control said student's psychophysiological condition and his performance, with the input thereof connected to a respective output of said operator's console; an audio-visual display unit for presenting aural and visual signals to the student, respective inputs of which connect one output of said educational information unit and one output of said student's performance control unit;

an answer registering unit designed for registering the student's answers to educational information signals;

a comparator unit which compares the number of the stu-

dent's answers to a certain amount of lesson material with the reference number of answers and generates a signal indicating a required number of reviews of said amount of educational material, wherein one input is connected to an output of said answer registering unit, the other input is connected to the other output of said educational information unit, and the output is connected to a respective input of said operator's console;

a student's response registering unit intended for registering said student's phychophysiological responses;

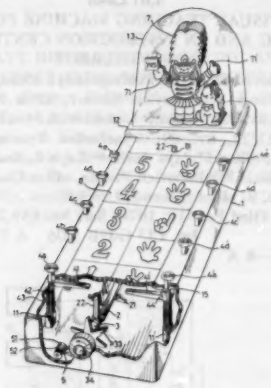
a student's condition checking unit which is a facility for evaluating the psychophysiological parameters of said student and comparing them with the reference values, wherein one input is connected to an output of said student's response registering unit, the other input is connected to the other output of said student's performance control unit, and the output is connected to a respective input of said operator's console.

4,012,849

EDUCATIONAL QUIZ AND ANSWER TOY

Hsing-Ching Liu, and Lan-dih Liu, both of 3F, No. 213, Chuong Ching N. Road, Taipei, China /Taiwan

Filed Sept. 18, 1975, Ser. No. 614,519
Int. Cl.² G09B *3/06*
U.S. Cl. 35—9 R **9 Claims**



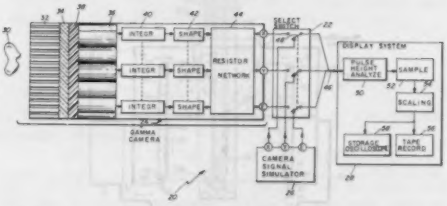
1. An educational toy comprising an elongated base portion, a cylinder extending longitudinally of the base portion having a plurality of protrusions around its outer periphery extending outwardly in different radial directions, a shaft retained inside said cylinder having a front end and a rear end extending from said cylinder and means permitting it to slide with respect to said cylinder and to rotate together therewith, at least one upwardly extending setting guide member on said cylinder, a first series and a second series of a plurality of push rods longitudinally spaced along said base portion having transverse lever arms extending over the said protrusions on said cylinder, each rod being surrounded by a compressible spring at a section between its lever arm and the bottom of the base portion, a changeable quiz and answer combination card having at least one setting hole for engagement with said at least one guide member for setting the card in place on the said base portion and said cylinder in a position such that said protrusions are in a predetermined arrangement related to said lever arms and card, said card having a plurality of questions associated with said first series of push rods and corresponding answers associated with said second series of push rods but in different order, and indicating means operatively connected with said shaft, whereby only when said first and second series of push rods are sequentially and alternately pushed to match the questions with the correct answers will the lever arms act on said protrusions to rotate said cylinder and shaft sufficiently to cause said indicator to give an indication that all answers are correct.

4,012,850

RADIOGRAPHIC CAMERA SIMULATOR

James A. Keith, Concord, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed July 14, 1975, Ser. No. 595,950
Int. Cl.² G09B *25/00*
U.S. Cl. 35—10 **8 Claims**



6. A simulator of a radiographic camera comprising:

means for generating a train of pulses having the frequency distribution of a train of radioactive events as provided by a train of pulses of said camera; means coupled to said pulse train generator for modulating the amplitude of a train of said pulses with a monotonically increasing waveform;

a gate coupled to said modulating means;

means coupled to said pulse train generator for generating random numbers in response to occurrences of pulses of said pulse train; and

means coupled between said gate and said random number generating means for operating said gate to pass pulses of said modulated pulse train when a first number of said random number generating means and a second number of said random number generating means are in accordance with a prescribed relationship, said gate operating means including means for providing said prescribed relationship, said first number and said second number of said random number generating means being location coordinates of a radioactive event.

4,012,851

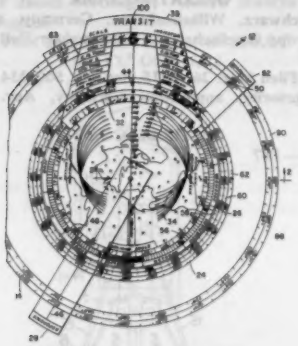
UNIVERSAL PLANISPHERE COMPLETE GUIDANCE AND COMPUTER SYSTEM

William A. Eisenhauer, Van Wert, Ohio

Division of Ser. No. 268,646, July 3, 1972, Pat. No. 3,858,334, which is a continuation-in-part of Ser. No. 500, Jan. 5, 1970, Pat. No. 3,678,710, which is a continuation of Ser. No. 600,920, Dec. 12, 1966, abandoned, which is a continuation-in-part of Ser. No. 369,958, May 25, 1964, Pat. No. 3,290,799, which is a continuation-in-part of Ser. No. 271,658, April 9, 1963, Pat. No. 3,251,143, which is a continuation-in-part of Ser. No. 851,648, Nov. 9, 1959, Pat. No. 3,088,228. This application Jan. 6, 1975, Ser. No. 538,579
The portion of the term of this patent subsequent to Jan. 7, 1992, has been disclaimed.
Int. Cl.² G09B *29/00*
U.S. Cl. 35—44 **4 Claims**

1. A planisphere comprising a plurality of concentric dials of progressively smaller diameter, a sky map on the smallest diameter dial having an Aries indicator portion extending radially therefrom, a Greenwich indicator dial having a Greenwich indicator portion extending radially therefrom positioned concentric with and adjacent the smallest diameter dial, a reference rule extending radially outwardly of the planisphere over the Greenwich indicator dial and plurality of dials, a sky mask dial positioned over and concentric with the

Greenwich indicator dial having a transit scale indicator portion extending therefrom and means securing all the dials and



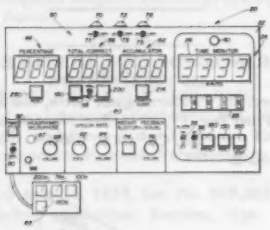
reference rule together centrally of the dials for rotation relative to each other.

4,012,852

TEACHING APPARATUS

Vida M. Journot, 5913 Quality Hill, Smithfield, Tex. 76080; Charles R. Deyo, and Jack B. Hunnicutt, both of Fort Worth, Tex., assignors to said Journot, by said Deyo and Hunnicutt, Tex.

Filed Mar. 25, 1975, Ser. No. 561,916
Int. Cl.² G09B 5/06
U.S. Cl. 35—48 R 5 Claims



1. Apparatus for recording the performance of a student who is responding to a test environment including a first counter recording a quantity of "correct" signals, a second counter recording the quantity of "correct" and "incorrect" signals, the "correct" and "incorrect" signals being generated by an operator in response to a student's answer, and further including a quantity display for selectively displaying a quantity of "correct" signals from the first counter or the quantity of "correct" and "incorrect" signals from the second counter, the improvement comprising:

first circuit means responsive to the quantity of "correct" and "incorrect" signals of the second counter and generating a signal varying in frequency with the recorded quantity,

second circuit means responsive to the quantity of "correct" signals in the first counter and generating a signal varying in frequency with the recorded quantity,

third circuit means responsive to the signals varying in frequency of said first and second circuit means to generate a percentage signal varying with the percentage of "correct" signals generated for the recorded quantity of "correct" and "incorrect" signals, and

percentage display means responsive to the percentage signal for indicating the percentage of "correct" signals generated for the recorded quantity of "correct" and "incorrect" signals.

4,012,853

FOREPART INSOLE RING SHOE CONSTRUCTION

Newton C. Turner, Jr., Nashville, Tenn., assignor to Genesco. Inc., Nashville, Tenn.

Filed May 20, 1976, Ser. No. 688,227
Int. Cl.² A43B 13/18
U.S. Cl. 36—17 R 6 Claims

1. A shoe comprising:

a. an upper having an forepart margin and a backpart margin,

b. a full-length outsole member having a forepart portion and a backpart portion joined by a ball area, and an outer edge,

c. a forepart insole ring member between said upper and the forepart portion of said outsole member,

d. said ring member having front and side outer edges coterminous with the outer edge of the forepart portion of said outsole member, and an inner edge,

e. said ring member further comprising a rear portion extending transversely between said upper and said outsole member, said rear portion having an outer rear edge terminating in the ball area of said outsole member,

f. means securing said ring member to the forepart margin of said upper,

g. means securing the forepart portion and ball area of said outsole member to said ring member and the backpart portion of said outsole member to the backpart margin of said upper, and

h. a raised portion on the forepart portion of said outsole member fitting within the inner edge of said ring member.

4,012,854

INFLATABLE SHOE

Steven P. Berend, 19 Pettit Drive, Dix Hills, N.Y. 11746, and Carmelo Giardina, 48 Hathaway Road, Wilmington, Mass. 01887

Filed Feb. 17, 1976, Ser. No. 658,483
Int. Cl.² A43B 13/20
U.S. Cl. 36—29 20 Claims

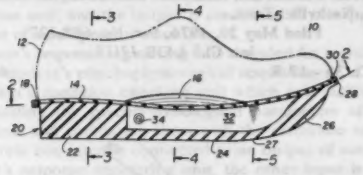
1. A shoe comprising, in combination:

an upper having a mid-sole integral therewith;

a bottom sole secured to said mid-sole, said bottom sole being substantially flat over the bottom surface thereof that extends between the heel and the metatarsal region of said shoe, said bottom sole extending upwardly over

the bottom surface thereof that is forward of the metatarsal region of said shoe;

and an air chamber located beneath said mid-sole, the extremities of said air chamber being positioned intermediate the heel portion and the metatarsal region of said shoe;



said mid-sole and said bottom sole each include marginal mating rims along which said mid-sole and said bottom sole are secured to each other;

said mid-sole and said bottom sole are secured to each other along said marginal, mating rims by at least one row of stitches.

4,012,855

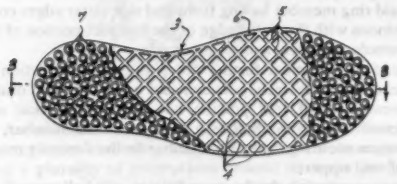
ANTI-SKID FOOTWEAR

Denys Gardner, 1529 Acton Blvd., Acton Vale, Canada

Filed Oct. 28, 1975, Ser. No. 626,025

Int. Cl.² A43B *13/20, 23/28*

U.S. Cl. 36—29 **1 Claim**



1. An anti-skid footwear comprising an outsole of resilient and flexible rubber sponge material and of substantially uniform thickness throughout so that it will yield under the weight of a wearer, said outsole defining a flat outer face and a flat inner face and having cavities opening at the inner face and extending in the outsole short of the outer face, the bottom of said cavities and said outer face defining a thin outer wall, and partitions of substantially uniform thickness separating said cavities from one another in laterally spaced-apart relationship across the outsole, said cavities and partitions evenly distributed across the entire extent of said outsole, the periphery of said outsole having a continuous side wall of a thickness substantially equal to the thickness of said partitions, an insole adhered to the inner face of the outsole and closing said cavities, and evenly distributed discrete protuberances integrally formed on the outer face of the outsole for tractive engagement of the outsole on a supporting surface, said outer wall yielding and flexing to conform to irregularities of said supporting surface under the weight of a wearer of said footwear.

4,012,856

GRAB OR GRAB BUCKET AND METHOD OF OPERATING SAME

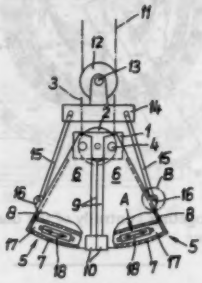
Wilhelm Schwarz, Wilhelmshaven, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Mar. 26, 1975, Ser. No. 562,234

Claims priority, application Germany, Apr. 1, 1974, 2415664

Int. Cl.² B66C *3/02*

U.S. Cl. 37—187 **8 Claims**



1. A method of actuating a grab bucket with two grab bucket sections for pourable material by use of plural vibrators recessed in the bottom of the bucket, which includes the steps of: during the closing of said bucket sections subjecting at least one of said two bucket sections at the closing edges thereof to vibrator oscillations with the amplitudes thereof directed in the direction of the closing movement of at least said one bucket section.

4,012,857

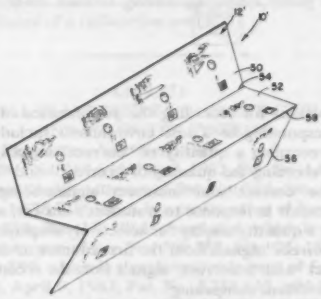
MEANS FOR INCORPORATING MULTIPLE FIRST DAYS OF ISSUE STAMPS

John Leskovec, Jr., 79 Morningside Drive, Elmira, N.Y. 14905

Filed Dec. 17, 1975, Ser. No. 641,680

Int. Cl.² A41C *3/00*

U.S. Cl. 40—2 B **8 Claims**



1. A means for displaying first day covers comprising:

a unitary backing sheet sectioned into a plurality of adjacent portions;

a complete set of first day covers including a plurality of units with each unit being located in one of said portions and including a postal stamp permanently affixed to said backing sheet, a post office cancellation mark partly on said stamp and partly on said backing sheet, the words "first day of issue", and a postmark indicating where said stamp was issued, each of said units representing one unit of said complete set of first day covers;

said backing sheet being continuous and uninterrupted throughout the length thereof so that said plurality of first day covers are all mounted on the same sheet.

4,012,858

PRESENT CARD

Eric Robert James McGregor, "Gwern Hwlcyn", Bodfari, Clwyd, England

Filed July 25, 1975, Ser. No. 598,947
Int. Cl.² G09F 1/12
U.S. Cl. 40—152 1 Claim

1. A greeting card picture framing kit comprising: a first substantially rectangular element having a tongue pivotally attached to each edge thereof, the tongue being adapted to be folded so as to overlie the planar face of the element, a second substantially rectangular element having a tongue pivotally attached to an edge thereof and of a size equal to one of the tongues on the first rectangular element whereby the rectangular elements can be juxtaposed with the two tongues superposed, means for removably adhering said two juxtaposed tongues the second element adapted to be removed from the first element so as to leave four tongues unobstructed along the edges of the first element, molded corner pieces each having an external U shaped cross section, the corner pieces being adapted to serve as internal corner pieces for any two folded over contiguous tongues, thereby providing a self contained picture frame.

4,012,859

MECHANISM FOR FIREARMS

Lennart Johan Ivar Johansson, Eskilstuna; Eric Vilhelm Wallberg, Vallingby, and Bjorn Weine Lindqvist, Eskilstuna, all of Sweden, assignors to Forenade Fabriksverken, Eskilstuna, Sweden

Filed Apr. 21, 1975, Ser. No. 569,801
Claims priority, application Sweden, Apr. 23, 1974, 7405471
Int. Cl.² F41C 11/00
U.S. Cl. 42—75 C 5 Claims

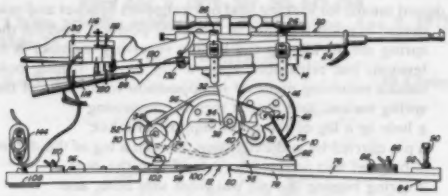
1. A firearm mechanism comprising, in combination, an upwardly closed and downwardly open breech-block housing substantially U-shaped in cross-section and having two end walls arranged for mounting a stock and a barrel respectively to said housing, a breech-block arranged to be guidably moved reciprocally in said housing by propelling and repelling means, a lower mounting for closing said breech-block housing and having upstanding side walls for supporting a trigger mechanism and cartridge feeding means and which, after insertion from below into a closing position, projects into said breech-block housing, said breech-block housing formed as a composite construction, comprising a preferably precision-cast inner housing part having two end portions constituting said housing end walls and a relatively thin, intermediate portion extending only in an upper portion of said housing between said end portions and an outer casing part of thin sheet metal formed by pressing and extending throughout the full height of said housing, said inner housing part being covered by and fixedly connected in close contact by brazing or the like with said outer casing part so as to stiffen said outer casing part.

4,012,860

ADJUSTABLE RIFLE REST

Arnold J. Auger, 636 Zener, Pocatello, Idaho 83201

Filed May 28, 1975, Ser. No. 581,689
Int. Cl.² F41C 29/00
U.S. Cl. 42—94 11 Claims



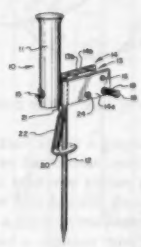
1. A long gun rest comprising an upper elongated generally horizontal support member including first means for removably stationarily supporting a long gun therefrom with said long gun extending longitudinally of said support member, a lower base, second means supporting said support member from said base for oscillation about a generally horizontal axis extending transversely of said support member and spaced below said first means, and third means operatively connected between said base and said support member for infinite angular adjustment of said support member relative to said base about said axis throughout at least a limited sector of adjustment, said third means including rotary actuating means therefor supported from said base and drivingly connected to said support member for angular displacement of the latter through a drive mechanism including a numerically high drive ratio.

4,012,861

FISHING POLE HOLDER

Walter L. Gellatly, 350-35th St., Ogden, Utah 84403

Filed Dec. 22, 1975, Ser. No. 642,690
Int. Cl.² A01K 97/10
U.S. Cl. 43—15 1 Claim



1. A fishing pole holder comprising
an elongate spike;
a generally U-shaped pivot support bracket fixed to an upper end of said spike with the legs of said bracket cantilevered therefrom;
an elongate, tubular fishing pole handle receiving member having an open handle receiving end;
a generally U-shaped detent bracket bolted to said fishing pole handle receiving member with the legs of said

bracket cantilevered therefrom and straddling the legs of the pivot support bracket;

means pivotally connecting the legs of the detent bracket to the legs of the pivot support bracket whereby the detent bracket will pivot with respect to the pivot support bracket;

spring means biasing the tubular handle receiving member such that the detent bracket pivots in one direction with respect to the pivot support bracket to a released position, said spring means comprising

a spring securement collar slidably surrounding and projecting from the spike, a coil spring, means for attaching one end of said coil spring to the end of said spring securement collar, and means for attaching the other end of the spring to the detent bracket;

detent means for locking said pivot support bracket and said detent bracket together in a cocked position wherein the spring means biasing the handle receiving member is in tension, but releasable upon a tug on the fishing pole handle receiving member in opposition to the bias of the spring means, said detent means comprising

a hole in a leg of the pivot support bracket;

a pin carried by and extending through a leg of the detent bracket and adapted to extend into the hole;

a spring biasing the pin out from said hole; and

cooperating limit means on the detent bracket and the pivot support bracket to limit the amount of pivoting of the detent support bracket relative to the pivot support bracket, said cooperating limit means comprising an arcuate slot in a leg of the support bracket and a detent member projecting from a leg of the detent bracket and into said slot whereby said detent member will move in the arcuate slot during pivoting of the detent support bracket relative to the pivot support bracket.

4,012,862

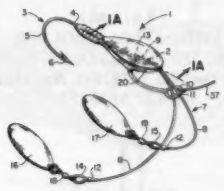
ARTIFICIAL FISHING LURE AND SPINNER

Eugene Dubois, 1057 Sunshine, Baker, La. 70714

Filed Apr. 14, 1975, Ser. No. 567,526

Int. Cl.² A01K *85/00*

U.S. Cl. 43—42.06 **8 Claims**



1. An artificial fishing lure which comprises:

a. a body means;

b. a hook means having a shank section, bend section and barbed point section, said shank section attached to one end of said body means whereby said barbed point section is directed back toward said body means; and

c. a guard means constructed from a single metal wire and having a spinner wire section, a loop section and a connecting section attached to said body means wherein said spinner wire section passes through said loop section and curves back toward said barbed point section.

4,012,863

DOWNRIGGER RELEASE

John Lori, 14145-138th Ave., Grand Haven, Mich. 49417

Filed Mar. 12, 1976, Ser. No. 666,189

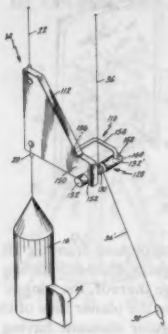
Int. Cl.² A01K *95/00*

U.S. Cl. 43—43.12 **18 Claims**

1. Apparatus for releasably supporting a fishing line with respect to a downrigger line assembly including a suspension line and a weight, said release apparatus comprising:

a support member adapted for mounting on said downrigger line assembly, said support member having an extending portion forming a socket, said socket opening downwardly toward the weighted end of said suspension line;

a fitting having end portions at least one of which is adapted to be received in said socket; and



means on said fitting adapted to receive a fishing line, said means being positioned generally between the ends of said fitting, said one end of said fitting being normally held in said socket with maintenance of a force on the fishing line, said fitting releasing from said socket with relaxation of said force.

4,012,864

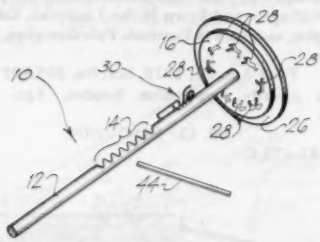
TOY MOVIE STICK

D. Barry Lister, 667 Douglas St., Kamloops, British Columbia, Canada

Filed Jan. 19, 1976, Ser. No. 650,378

Int. Cl.² A63H *33/22*

U.S. Cl. 46—47 **4 Claims**



1. A hand-held toy movie stick comprising in combination:

an elongated rod-like element having a row of substantially identically configured longitudinally-aligned notches formed along at least one surface thereof;

a first disc element rotatably mounted at one end of said rod-like element and provided with a plurality of circumferentially spaced apertures defining in sequence a series of related animated representations;

a second planar screen element having a light-reflective surface mounted at said one end of said rod-like element coaxially with and longitudinally spaced outwardly from said first disc element;

means mounted on said rod-like element adapted to selectively project a beam of artificial illumination therealong and through the apertured section of said first disc element in alignment therewith and onto said second planar element for reflection therefrom;

and a rubbing member adapted to be stroked across and in

contact with said row of notches of the rod-like element to thereby impart selected rotational movement to said first disc element.

4,012,865

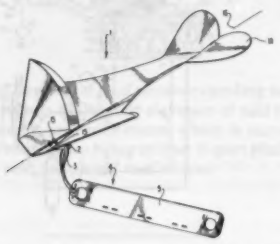
TOY AIRPLANE OF FOLDABLE SHEET MATERIAL AND LAUNCHING MEANS FOR AND METHOD OF MAKING SAME

Irvin L. Fields, 708 Center Ave., Holly Hill, Fla. 32017

Division of Ser. No. 374,327, June 28, 1973, Pat. No. 3,885,343, which is a continuation-in-part of Ser. No. 277,237, Aug. 2, 1972, Pat. No. 3,768,198. This application Mar. 21, 1975, Ser. No. 560,688

Int. Cl.² A63H 27/14

U.S. Cl. 46—79 15 Claims



1. A toy airplane comprising: a plurality of sheets of normally flat sheet material folded into an airplane configuration having a body section and a wing section, both of said body section and said wing section being substantially symmetrically disposed with respect to a longitudinal airplane axis, said body section and wing section being constructed so as to fly through the air upon being released in the air above a predetermined starting velocity, wherein a first of said sheets includes a slot through which a portion of a second of said sheets protrudes in the assembled condition of the airplane.

4,012,866

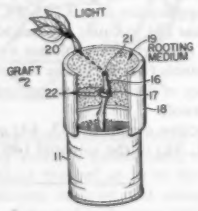
METHOD OF ROOT STOCK PROPAGATION

William Henley Brokaw, 9462 Telephone Road, Ventura, Calif. 93003

Filed Mar. 1, 1976, Ser. No. 662,519

Int. Cl.² A01G 1/06

U.S. Cl. 47—6 4 Claims



1. A method of root stock propagation of avocados which includes the steps of:

a. providing a metal collar having sufficient width along the axial direction of the collar to provide a relatively large smooth inside surface area;

b. positioning said collar loosely about a root stock grown from a bud grafted to an avocado seedling wherein the bud is from a clone and is selected from a species of avocado trees having desired characteristics including immunity to certain diseases and desired growth characteristics; and

c. Controlling the growth for a given time after which the seedling, root stock and collar may be transplanted as a body, the root stock growing to a size inside the collar causing the collar to gradually constrict the flow of nutrients to said seedling and promote rooting of the root stock while gradually killing the seedling so that the seedling finally disintegrates and there is left a properly rooted avocado plant, having said desired characteristics.

4,012,867

GROWTH OF PLANTS

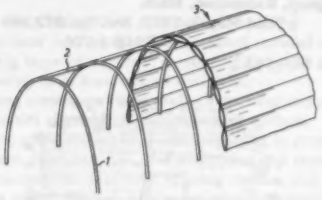
David Lindsay Guy Lainchbury, Surbiton, and John Edward Preedy, Croydon, both of England, assignors to The British Petroleum Company Limited, London, England

Filed Apr. 8, 1976, Ser. No. 675,168

Claims priority, application United Kingdom, Apr. 9, 1975, 14546/75

Int. Cl.² A01G 9/00

U.S. Cl. 47—17 19 Claims



1. A closed structure for enclosing plants which comprises an outer light transmitting wall relatively impermeable to carbon dioxide and an inner light transmitting wall relatively permeable to carbon dioxide and gas-admitting means for introducing between the inner and outer walls, carbon dioxide gas.

4,012,868

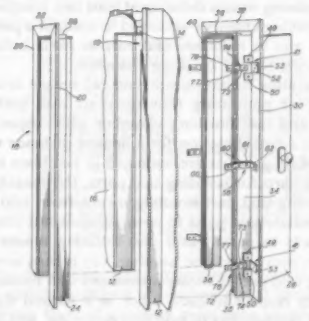
PREHUNG DOOR ASSEMBLY

Julian Andruszkiewicz, 540 Hawthorne, Elmhurst, Ill. 60126

Filed Feb. 13, 1975, Ser. No. 549,508

Int. Cl.² E06B 1/10

U.S. Cl. 49—380 11 Claims



1. A split jamb door assembly for mounting in a door opening and for engaging matching split jambs, including

spaced matching side jamb parts,

a top jamb connecting the spaced side jamb parts,

a door connected by a plurality of spaced split hinge assemblies to one of the side jamb parts,

each split hinge assembly having a uniplanar plate member fastened to the door, said uniplanar plate member joined to a hinge pivot, and

each split hinge assembly having a split plate member joined

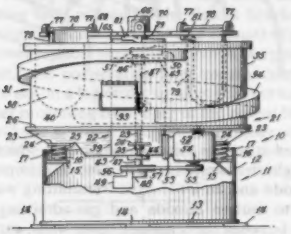
to said pivoted hinge, each split plate member having a stud plate part normal to the door fastened uniplanar plate member when said split hinge assembly is in closed position, said stud plate part having a plurality of mounting apertures for fastening the stud plate part to the front of a wall stud, and said split member further having an adjoining jamb plate part fastened to a side door jamb part and extending normally to said stud plate part.

4,012,869

RECIPROCAL FINISHING APPARATUS

Gunther W. Balz, Kalamazoo, Mich., assignor to Roto-Finish Company, Kalamazoo, Mich.

Filed May 2, 1975, Ser. No. 573,906
Int. Cl.² B24B *31/06*
U.S. Cl. 51—163.2 13 Claims



1. A finishing machine suitable for finishing the surfaces of a plurality of parts with finishing material while maintaining said parts isolated from each other to prevent damage to said parts as a result of collision therebetween, and then separating finished parts, said finishing machine comprising:

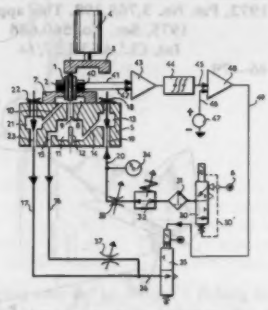
1. a finishing chamber,
2. means for imparting movement to said finishing chamber to cause the parts contained therein to be finished by interaction with said finishing material,
3. part-isolating means defining at least one compartment in said finishing chamber arranged to contain a part or parts therein and to maintain said part or parts isolated from other parts in said finishing chamber,
4. reciprocating means comprising (a) means arranged for moving or permitting movement of said part-isolating means and said finishing chamber with respect to each other in a first direction for a limited distance while said part-isolating means are arranged in positions intermediate said parts for isolating said parts, (b) means arranged for moving said part-isolating means from said positions intermediate said parts to new positions not intermediate said parts to permit said part-isolating means and said parts to move past one another, (c) means arranged for moving said part-isolating means and said finishing chamber with respect to each other in a second direction in reverse relationship to said first direction, and (d) means arranged for returning said part-isolating means to positions which are intermediate said parts,
5. part-separating means operatively associated with said finishing chamber for separating finished parts from finishing material in a separating zone, and
6. said part-separating means, said finishing chamber, and said part-isolating means being arranged with respect to each other so as to permit individual separation of the part or parts isolated in a compartment defined by said part-isolating means when said compartment is in said separation zone.

4,012,870

APPARATUS FOR MEASURING AND CHANGING VIBRATION FREQUENCY OF METAL B

Michel G. Berniere, 4 Allee des Hauts-Dimanches, 78430 Louveciennes, and Didier M. Beaudet, 86 rue Elias Howe, 94100 Saint-Maur des Fosses, both of France

Filed June 25, 1975, Ser. No. 590,034
Claims priority, application France, July 3, 1974, 74.23143; Apr. 4, 1975, 75.10602
Int. Cl.² B24B *49/10*
U.S. Cl. 51—165 R 14 Claims



1. An apparatus for measuring the natural vibration frequency of a ferromagnetic metal bar comprising

a vertical insulating cylinder (2);

pneumatic means to freely suspend the bar at the center of the cylinder (2) including

a compressed air source (6) of constant adjustable output in pressure,

a distribution block (5) connected to the lower part of the insulating cylinder (2),

a connecting element (7) formed with an inner cavity (8),

a central air inlet nozzle (9) connected to the compressed air source, the lower end of the insulating cylinder (2) and the upper end of the central air inlet nozzle (9) opening directly into the cavity, the cavity (8) being situated in the extension of the insulating cylinder (2) and connected to the compressed air source by said central nozzle,

and at least one lateral exhaust nozzle (10, 50) in pneumatic communication with cavity (8) the pressure within the cavity defining the equilibrium position of the bar;

vibration application means (53, 54, 55; 57, 58; 3, 4) acting on the bar (1) to cause the bar to vibrate;

a solenoid (40) which establishes a constant magnetic field, the terminals (41, 42) of the solenoid having the vibration frequency of the bar superimposed thereon for the detection thereof;

and a selective amplifier (43, 44) connected to the terminals (41, 42) of the solenoid (40).

4,012,871

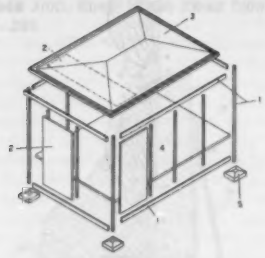
MODULAR HOUSING UNITS

Tito Livio Martins Netto, and Ludgero Raul Barbetta, both of Sao Paulo, Brazil, assignors to Acacia Engenharia Industria E Commercio, Sao Paulo, Brazil

Filed Dec. 1, 1972, Ser. No. 311,100
Claims priority, application Brazil, Dec. 1, 1971, 000071
Int. Cl.² E04B *1/348*
U.S. Cl. 52—79.4 6 Claims

1. In a housing construction to be inhabited by human beings, a plurality of modular housing units to be assembled together to provide a housing construction of a desired size and configuration having a desired number of rooms, each of said modular units having a peripheral floor means and a

peripheral roof means for connecting a pair of said modular units to each other with one of the modular units situated over the other of the modular units, each of said modular units including a floor means surrounded by a peripheral floor means and a roof means surrounded by said peripheral roof



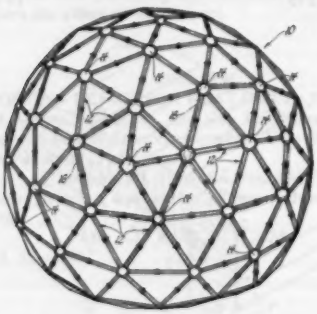
means, and said peripheral roof means extending to an elevation at least as high as the highest elevation of said roof means surrounded thereby, said roof means which is surrounded by said peripheral roof means being at least in part pitched downwardly toward said peripheral roof means.

4,012,872

GEODESIC DOME-LIKE PANELS

Roger Mitchell Stolpin, 1629 Ohio Ave., Flint, Mich. 48506

Filed May 11, 1976, Ser. No. 685,239
Int. Cl.² E04B *1/32*
U.S. Cl. 52—81 **13 Claims**



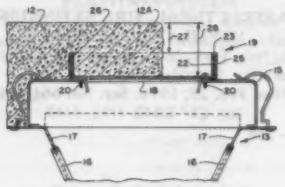
1. A geodesic dome-like structure comprising: a plurality of triangular panels having sides of substantially equal length extending between vertices thereof so as to form generally equilateral triangular shapes; each of said triangular panels including a plurality of elongated rods extending along each side thereof in spaced relationship to each other; the rods associated with each side of each panel having opposite ends secured to the rod ends of the rods extending along the other sides of the associated panel; a plurality of generally planar hinge plates fixed to the rods in a longitudinally spaced relationship along each side of each panel with the planes of the plates oriented perpendicular to the elongated direction of the rods; pintles pivotally interconnecting the hinge plates of the triangular panels with the hinge plates of adjacent triangular panels; and said pintles being located intermediate the spaced rods of the panel sides pivotally connected thereby so that the panels pivot relative to each other about axes located outwardly from the panel sides.

4,012,873

PROTECTIVE CAP FOR UNDERFLOOR ACCESS HOUSING

Robert G. Lindner, Sewickley, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed May 12, 1976, Ser. No. 685,682
Int. Cl.² E04F *17/08, 19/08;* **H02G** *3/28*
U.S. Cl. 52—99 **3 Claims**



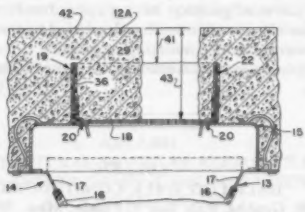
1. A wire distributing floor structure comprising:
a metal cellular subfloor presenting plural parallel cells,
an overlying layer of concrete presenting an upper surface,
a cell opening in at least one of said cells,
void forming means enclosing said cell opening and presenting an outlet opening below said upper surface,
a protective cap covering said outlet opening to protect the same from said concrete, said protective cap comprising a base secured to said void forming means, and an upstanding perimeter wall having an upper perimeter edge spaced below said upper surface of said concrete, and
a release coating provided on those surfaces of said protective cap juxtaposed with said concrete to prevent bonding of said concrete to said protective cap, thereby to facilitate breakout and removal of the overlying layer of concrete to expose said protective cap for removal.

4,012,874

PROTECTIVE COVER ASSEMBLY FOR UNDERFLOOR ACCESS HOUSING

Darryl Keefer Brogan, Bethel Park; Paul Leon Haskins, Aliquippa, and Robert George Lindner, Sewickley, all of Pa., assignors to H. H. Robertson Company, Pittsburgh, Pa.

Filed May 12, 1976, Ser. No. 685,683
Int. Cl.² E04F *17/08, 19/08;* **H02G** *3/28*
U.S. Cl. 52—99 **10 Claims**



1. A wire distributing floor structure comprising:
a metal cellular subfloor presenting plural parallel cells,
an overlying layer of concrete presenting an upper surface,
a cell opening in at least one of said cells,
void forming means enclosing said cell opening and presenting an outlet opening below said upper surface,
a protective cover assembly covering said outlet opening to protect the same from said concrete, said protective cover assembly comprising a cap having a base secured to said void forming means and an upstanding perimeter wall, and a fence-like vertical extension detachably connected to said cap and having an upper perimeter edge spaced below said upper surface of said concrete, and
a release coating provided on those surfaces of said protec-

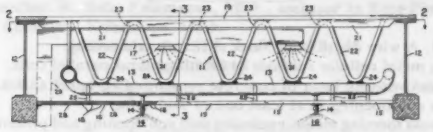
tive cover assembly juxtaposed with said concrete to prevent bonding of said concrete to said protective cap, thereby to facilitate breakout and removal of the overlying layer of concrete to expose said protective cover assembly for removal.

4,012,875

OVERHEAD STRUCTURAL, FIRE EXTINGUISHING AND VENTILATING SYSTEM

Morti Hirsch, New York, N.Y., assignor to Active Fire Sprinkler Corporation, Brooklyn, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,311
Int. Cl.² E04B *1/92, 5/48*
U.S. Cl. 52—168 **1 Claim**



1. An overhead structural fire extinguisher and ventilating system for use in building construction and comprising in combination:

a pair of spaced longitudinally extending girders,

a plurality of longitudinally extending spaced parallel steel joists each spanning between the girders,

each of the joists having an upper chord and a tubular lower chord with web members laced therebetween,

a ceiling below and depending from the lower chord to form an upper enclosure for a room,

means for circulating water through the tubular lower chord,

fire sprinkler nozzles operatively connected to the lower chord and penetrating through the ceiling to the room,

the fire sprinkler nozzles activated by heat,

ventilating air ducts positioned between the joists and connected to a source of ventilating air,

the ceiling provided with openings whereby the ventilating air passes from the ventilating air ducts in noncontact heat exchange relationship with the water in the lower chord and through the ceiling to the room,

the web members comprising a tube with a generally serpentine configuration having upper bends welded to the upper chord and lower bends welded to the lower chord,

the lower chords terminating in ports,

pipes joining at least some of the ports in flow communication.

4,012,876

HALF-LOG WALL CONSTRUCTION

George B. Grubbs, P.O. Box 1, Pinola, Miss. 39149

Filed Mar. 3, 1976, Ser. No. 663,349
Int. Cl.² E04B *1/10*
U.S. Cl. 52—233 **2 Claims**

1. In a building wall construction having generally semi cylindrical log members arranged in side-by-side relation with their curved surfaces outwardly and with flat inner surfaces secured to a supporting structure, the improvement comprising:

said log members being rabbeted along the longitudinal edges of their flat inner surfaces; and

filler strips extending longitudinally between adjacent log members, said filler strips having flange portions substantially filling said rabbets and having longitudinally extending central beads projecting outwardly in tight abutment with adjacent edges of adjacent log members said beads being of generally semi cylindrical shape and opposite sides thereof at the juncture between said beads and

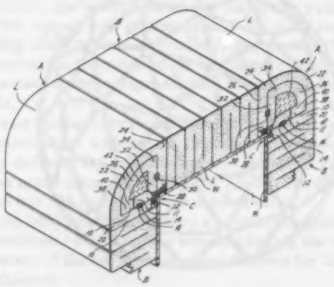
flange portions tightly abutting acute-angled edge portions of said log members with substantially line contact.

4,012,877

PREFABRICATED INSULATING STRUCTURE FOR INSULATING A CORNER IN A FURNACE

Carlisle O. Byrd, Jr., Houston, Tex., assignor to J. T. Thorpe Company

Continuation-in-part of Ser. Nos. 475,439, June 3, 1974, Pat. No. 3,952,470, and Ser. No. 603,391, Aug. 11, 1975. This application Apr. 2, 1976, Ser. No. 672,993
Int. Cl.² E04B *1/80*
U.S. Cl. 52—275 **12 Claims**



1. An insulating structure for insulating a corner between two walls in a furnace, comprising:

a. a folded insulating blanket of fiber insulating material, said folded blanket including:

1. a curved inner surface portion exposed to the interior of the furnace;

2. a first side surface portion extending from said curved inner surface portion to a fold formed in said blanket for placement adjacent a first one of the two furnace walls at the corner;

3. a second side surface portion extending from an opposite end of said curved inner surface portion from said first side surface portion to a fold formed in said blanket for placement adjacent the second of two furnace walls at the corner; and

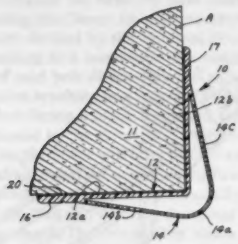
b. means for attaching said insulating blanket to the furnace walls at the corner.

4,012,878

UNITARY WALL MEMBER GUARD

Robert T. Ellingson, Burnsville, Minn., assignor to Astro Plastics, Inc., Rosemount, Minn.

Filed Apr. 14, 1976, Ser. No. 677,042
Int. Cl.² E04B 5/00; E04F 13/06; E04B 7/00; E04F 19/02
U.S. Cl. 52—288 4 Claims



1. A unitarily formed wall member guard structure, comprising

a separated body portion formed of resilient deformable material,

said body portion having an underlying and an overlying layer,

said layers having common side edge portions at either side of said body portion,

said overlying layer diverging from the underlying layer at an acute angle from each of said common side edge portions defining a space therebetween of increasing separation,

said underlying layer having a smooth unbroken underlying surface conforming to an underlying wall surface, and

said overlying layer deformably yielding under impact to insulate said underlying layer and underlying wall surface from the effect of said impact,

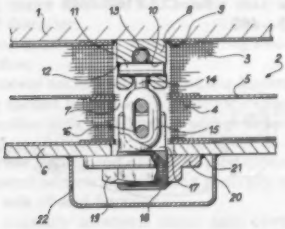
---

4,012,879

SUPPORTING DEVICE FOR HEAT-INSULATING PANELS

Michel Aubert, Manosque, and Guy Lemercier, Le Puy Ste. Reparade, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed June 10, 1976, Ser. No. 694,583
Claims priority, application France, June 16, 1975, 75.18768
Int. Cl.² E04B 1/38, 2/28
U.S. Cl. 52—508 6 Claims



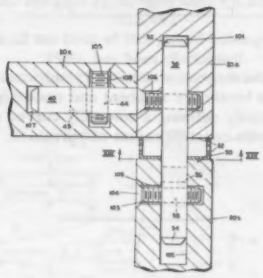
1. A supporting device for heat-insulating panels to be placed opposite to a wall to be protected, especially the vault roof of a fast reactor, wherein said device comprises a first yoke rigidly fixed to the wall to be protected and adapted to carry a first cross-pin around which is mounted a first link of a supporting element, said link being capable of moving with respect to said first cross-pin, and a second yoke joined to a bearing wall, the heat-insulating panels being applied against said bearing wall and so arranged as to extend parallel to the wall to be protected, said second yoke being supported by means of a second cross-pin by the last link of the supporting element, said last link being free with respect to said second cross-pin.

4,012,880

PARTITION SYSTEM

Charles F. Logie, Spring Lake, Mich., assignor to American Store Equipment Corporation, Muskegon, Mich.

Filed Apr. 28, 1976, Ser. No. 681,262
Int. Cl.² E04B 1/48
U.S. Cl. 52—585 24 Claims



1. A partition system for joining a panel element to another panel element, wall, or the like comprising a first panel element having a receiving aperture extending into one surface thereof; at least one of a second panel element or wall; connecting pin means for connecting said panel to the said one of said second panel element or wall; securing means for securing said pin means to at least one of said second panel element or wall; said pin means extending into said receiving aperture in said first panel element, having a longitudinal axis, and including a pair of pin apertures spaced apart along said pin axis, said pin apertures being located in that portion of said connecting pin means which extends into said receiving aperture in said first panel element; a securing aperture extending through another surface of said first panel element and communicating with said receiving aperture in said first panel element; a fastener extending through said securing aperture and secured to said pin means in one of said two pin apertures in said pin means; said other pin aperture in said pin means adapted to receive said fastener therein through said securing aperture when a third element is secured between said one surface of said first panel element and the said one of said second panel or wall.

4,012,881

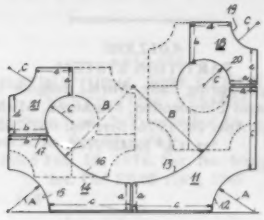
ARCHITECTURAL MODULAR ELEMENTS FOR FORMING AND-OR COMPLETING MONUMENTS OR LIKE WORKS OF ART

Elio Martiradonna, via Stoppani 25, 20129 Milan, Italy

Filed Dec. 6, 1974, Ser. No. 530,408
Claims priority, application Italy, Dec. 14, 1973, 36146/73[U]
Int. Cl.² E04C 1/12; E04B 1/02
U.S. Cl. 52—604 6 Claims

1. A combination comprised of: a plurality of modular structural elements each comprising a block having a substantial extent in three dimensions and defined by a plurality of mutually perpendicular planar surfaces intersecting at right angles to defining modular lengths edges of said block, and at least one concave cylindrical surface segment having a longitudinal axis of modular length and positioned with the longitudinal axis parallel to respective ones of the modular length block edges and intersecting a perpendicular pair of said planar surfaces to define a concave cylindrical edge portion of

said block; adjacent ones of said modular structural elements being positioned with adjacent respective planar surfaces thereof coextensive and with the respective modular length edges bounding the adjacent coextensive planar surfaces positioned so that the respective concave cylindrical edge portions of the adjacent blocks are adjacent and smoothly merge with one another jointly defining a smoothly curved concave surface having a non-constant radius of curvature.



4,012,882

STRUCTURAL BUILDING PANELS

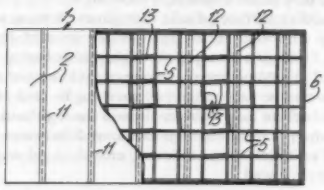
Ivan Bertram Juriss; Roger Douglas Hay; Andrew Culross Goodfellow; Thomas Townson, and Keith Eric Hay, all of Auckland, New Zealand, assignors to Industrialised Building Systems Limited, Auckland, New Zealand

Filed Apr. 19, 1973, Ser. No. 352,749

Claims priority, application New Zealand, Apr. 19, 1972, 166928; Nov. 22, 1972, 169085

Int. Cl.² E04C 2/36; E04B 2/10

U.S. Cl. 52—615 8 Claims



1. A structural building panel serving for the whole floor or roof of at least one room, comprising a pair of continuous skins and a core, said skins including a plurality of sheets of suitable material bonded edge to edge, said core including a plurality of strips of suitable material positioned such that the edges of each strip are fixed one to each skin, said strips being arranged in two sets, with each strip in each set being substantially parallel with each other and each set being arranged to lie at a suitable angle to the other set, the strips of each set having a notch extending to one-half the depth of the strip at the points of intersection with the strips of the other set, the weakness of the panel due to said notches being overcome by spacing the strips in each set relative to the depth of each strip at a minimum ratio of 2:1, the weakness of the panel due to the tendency of the strips to buckle being overcome by spacing the strips in each set relative to the thickness of each strip at a maximum ratio of 60:1, and the weakness of the panel due to the tendency of the skin to buckle being overcome by spacing the strips in each set relative to the thickness of the skin at a maximum ratio of 60:1.

4,012,883

DEVICE FOR SECURING A BEAM TO SHEET PILING

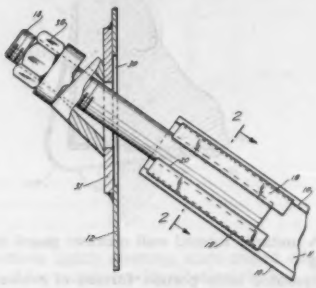
Ludwig Müller, 44-46 Heinrich-Heine Strasse, 3550 Marburg, Lahn, Germany

Filed July 8, 1975, Ser. No. 594,027

Claims priority, application Germany, July 10, 1974, 7423433

Int. Cl.² E04B 1/343; E02D 5/00

U.S. Cl. 52—729 5 Claims



1. A fastening device on a double-T beam to be driven into the ground and then to be secured at its head end to a sheet piling, said device comprising:

a double-T beam having a web and two cross arms;

an anchor bolt having at one end a lengthwise elongate slot fitting the thickness of the web of the beam, said bolt being inserted at its slotted end upon said web, the length of the anchor bolt being such that it protrudes from the respective end of the beam;

welding joints securing the anchor bolt in said inserted position to the web;

bracing bars inwardly extending from wall portions of each of the cross bars of said beam, one end of each of said bracing bars being welded to the respective cross bars and the other end to said anchor bolt; and

fastening means for securing said anchor bolt to a sheet piling.

4,012,884

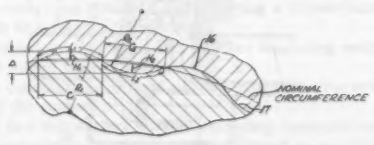
PRESTRESSED CONNECTION AND FASTENER THEREFOR

Paul V. Pagel, Fullerton, Calif., assignor to Kaynar Mfg. Co., Inc., Fullerton, Calif.

Continuation of Ser. No. 182,535, Sept. 21, 1971, abandoned. This application Sept. 24, 1975, Ser. No. 616,131

Int. Cl.² F16B 5/02

U.S. Cl. 403—408 11 Claims



1. A bolted connection comprising a plurality of members formed of a metal having a first degree of hardness and each having a bolt receiving bore formed at a basic nominal diameter, the members being disposed to align the bores thereof;

a bolt received in said aligned bores and formed of a metal having a degree of hardness greater than said first degree and being in the configuration of an elongated element having a head integrally formed with a shank extending therefrom and terminating in a fastening portion opposite

the head, said shank being in the general form of a right circular cylinder of a diameter substantially equal to said basic nominal diameter, the shank having uniformly circumferentially spaced arcuate corrugations axially extending between the head and fastening portion, the corrugations forming a continuously arcuate surface and having respective alternately circumferentially spaced crests and roots all radially spaced from the basic nominal diameter at substantially the same distance and providing an interference fit between said shank and the metal surrounding the bores in said members, the number of said crests divided by the nominal circumference of said bolt resulting in a number in the range of 14 to 32, the radius of said bolt divided by the radius of said arcuate corrugation resulting in a number within the range of 2 to 5, said bolt being a force fit in said aligned bores and so proportioned to the bores that a driven insertion of said shank into the bores will effect radial compression of said surrounding metal to a degree sufficient to cause controlled plastic flow of said metal radially and circumferentially of the bolt and to bring the metal into close contact with the shank for minimizing stress corrosion of the bolted connection; and

a cooperating fastening member secured to said fastening portion of the bolt to tension the bolt and clamp the members together.

4,012,885

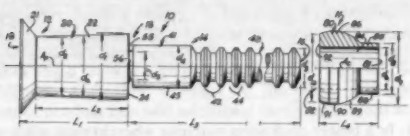
REVERSE TAPER FASTENER SYSTEM

John O. King, Jr., 3990 N. Ivy Road, Atlanta, Ga. 30342

Filed Mar. 3, 1975, Ser. No. 554,762

Int. Cl.² F16B *5/00*

U.S. Cl. 403—408 **28 Claims**



1. A fastener for connecting work pieces with aligned holes therethrough comprising:

an elongate bearing section adapted to extend through the holes, said bearing section having a leading end, a trailing end and a central axis, and said bearing section defining an exterior bearing surface thereon concentric about said central axis and tapering inwardly along said bearing section from a prescribed leading major bearing diameter adjacent the leading end of said bearing section larger than the diameter of the holes in the work pieces to a prescribed trailing minor bearing diameter trailing said leading major diameter and smaller than said first prescribed diameter;

an enlarged head integral with the trailing end of said bearing section;

an engagement section integral with the leading end of said bearing section having a major outside engagement diameter smaller than said leading major bearing diameter, said bearing section further defining an annular leading face on the leading end of said bearing section about said engagement section and oriented generally normal to the central axis of said fastener;

a pintail coaxially arranged about said central axis and opertively connected to the leading end of said bearing section, said pintail adapted to be engaged to install said bearing section in the holes; and,

an expansion collet removably and operatively associated with and leading said bearing section, said expansion collet defining an expansion surface thereon concentric about said central axis, said expansion surface having a leading minor expansion diameter at least as small as the diameter of the holes and a trailing major expansion diameter at least as large as said leading major bearing diameter of said bearing section, said section, said expansion collet defining an annular driven face on the trailing end thereof oriented generally normal to said central axis and engaged by said leading face of said bearing section to force said expansion collet through the holes.

4,012,886

BAG PUSH-OFF IN-FEED METHOD

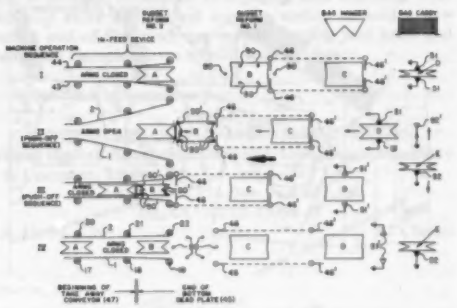
Thomas Charles Harris, Monroe, and Doyle Rayford Hudson, West Monroe, both of La., assignors to Olinkraft, Inc., West Monroe, La.

Continuation-in-part of Ser. No. 408,310, Oct. 23, 1973, Pat. No. 3,875,726. This application Dec. 17, 1974, Ser. No. 533,492

The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.

Int. Cl.² B65B *7/06, 43/00*

U.S. Cl. 53—38 **10 Claims**



1. The method of feeding non-rigid wall bags loaded with loose granular solid materials and having gusseted tops, which have been initially but not finally closed, on a one-by-one in-line basis into a machine wherein the bag tops are comprised of facing sheets of flat, flexible, non-rigid material which need to be properly aligned for further processing, such as for example the top of a bag being finally closed, comprising the following steps:

a. providing a bag handling machine including an in-feed device for the bags having an entry portion comprising two opposed members mounted on opposite sides of the center-line of the machine forming the throat of the in-feed device and located at the level of the bag tops, and a pusher conveying system associated with said in-feed device;

b. individually conveying each bag loaded with said granular solid material through an initial portion of the machine by means of a first pushing element of said pusher conveying system, while maintaining the bag free of contact with an adjacent loaded bags; but then conveying each bag loaded with said granular solid material to the entry portion of the in-feed device by pushing said non-rigid wall bag at its rear by means of a second pushing element of said pusher conveyor system while the bag is in face-to-face pushing engagement along its front side with the rear side of a preceding bag, the bag being pushed by the pushing element at its rear side, thereby being constrained at its front side by the preceding bag by means of said pushing engagement; whereby any tendency of said load of granular solid material to shift within the bag and open the initially closed gusseted top is reduced;

c. subsequently pushing off said non-rigid wall bag located at the entry portion of the in-feed device into the throat of said in-feed device, with said opposed members contacting the bag top under compression, by means of a follow-

ing bag contacting the rear side of the bag in face to face engagement and moving said following bag forward, and hence the preceding bag, by said second pusher element;

d. individually conveying the pushed-off bag with its rear side out of contact with the following bag with the top under compression through the in-feed device to the next processing station of the machine; and

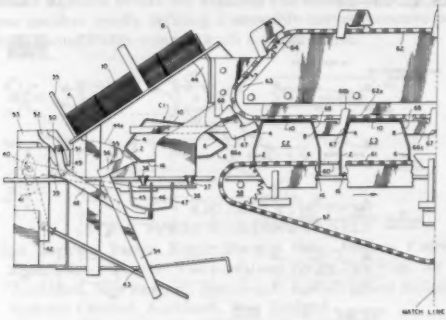
e. cyclically repeating steps "b"-"d" for the following bags in-line with the preceding ones.

4,012,887

PACKAGING MACHINE

Rodney K. Calvert, Dunwoody, and Dale K. Scott, Jonesboro, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Jan. 19, 1976, Ser. No. 650,175
Int. Cl.² B65B *5/10, 43/24*
U.S. Cl. 53—48 **9 Claims**



1. A packaging machine for setting up, loading, and closing the end flaps of collapsed sleeve type bottle containers having top walls which are more narrow than their bottom walls and having inwardly tapered sloping upper side wall panels, said machine comprising a hopper in which collapsed containers are disposed, means for withdrawing said containers in sequence from said hopper, means for initiating setting up of the containers, container advancing means including endless elements and spaced flight bars thereon for engaging the lower part of the trailing side wall of each of the containers in sequence and for moving the containers while disposed transversely along a preselected path in a rearwardly tilted condition and alongside loading and end flap closing stations, means for loading articles through at least one end of the containers, means for closing the container end flaps, and wherein the improvement comprises an upper endless element having a working reach movable above and along said preselected path, and a plurality of shaper blocks fixedly mounted in spaced relation on said upper endless element and respectively interposed between adjacent containers, each of said shaper blocks having a leading part which extends toward said upper endless element a greater distance than the trailing part thereof and each shaper block being engageable with at least a part of the sloping upper side wall panel of a preceding container in coordination with movement onto the working reach of said upper endless element to advance the rearwardly tilted upper part thereof relative to the lower part thereof and each shaper block also being engageable with at least a part of a succeeding container and being configured so as to cause the container side walls to define in cross section parts of a trapezoidal configuration.

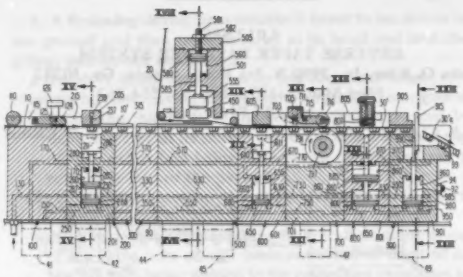
2. A machine for loading a group of articles through an open end of a sleeve type container having open end flaps foldably joined to adjacent end edges of the container top, bottom and side walls, said machine comprising means for advancing the container along a predetermined path with the container disposed astride and in transverse relation to said path, means for advancing a group of articles alongside said path of movement and adjacent an open end of the container, and wherein the improvement comprises an oscillatable loading arm disposed alongside said path and having an article engaging part mounting means for said loading arm arranged to move said article engaging part in a direction transverse to the path of movement of the container and of the group of articles and simultaneously movable in the direction of movement of the container and articles and engageable with the group of articles to cause the articles to move into the open ended container while the container and articles are moved continuously, said mounting means including fixed pivot means and a pivot link pivotally mounted at one end on said fixed pivot and pivotally interconnected at the other end with said loading arm at a part thereof remote from said article engaging part.

4,012,888

PACKAGING APPARATUS FOR FORMING, FILLING AND SEALING RECEPTACLES

Matthew Nichols, Norristown, Pa., assignor to Packaging Coordinators, Inc., Philadelphia, Pa.

Filed July 31, 1975, Ser. No. 600,837
Int. Cl.² B65B *5/02, 11/52, 61/26*
U.S. Cl. 53—131 **14 Claims**



1. In a blister-packaging machine wherein packaging material is treated at a succession of fluid-actuated stations arranged in-line and along which the packaging material is transported, including treatment means at the respective stations, including means for transporting the packaging material from station to station intermittenty and wherein the respective treatment means are programmed to treat the packaging material at dwell times in such intermittent transporting, and including conduit means for supplying actuating fluid to one of the stations, the improvement comprising a base for supporting the treatment stations in mutual alignment, the respective stations upstanding from the base and having material-supporting surfaces at a given height, abutting one another in sequence in the transport direction, and having registering bores therein for flow of actuating fluid directly from station to abutting station, beginning with the station to which the fluid is supplied by the conduit means, valve means for controlling the supply of actuating fluid to the respective treatment means, and programming means for timing such control valve actuation, to form a striplike succession of blister packages.

4,012,889

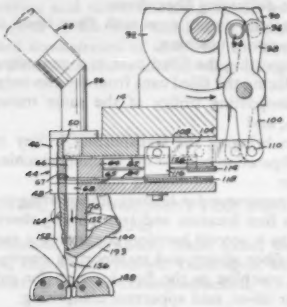
PACKAGING MACHINE

Yun-Hoon Chung, Rossford, Ohio, assignor to International Automated Machines, Inc., Perrysburg, Ohio

Filed Dec. 8, 1975, Ser. No. 638,902
Int. Cl.² B65B *1/02, 9/02*
U.S. Cl. 53—183 **8 Claims**

8. In a packaging machine of the type wherein product to be packaged is discharged into a metering cavity and then dispensed into an envelope formed to enclose the dispensed

product, the combination comprising a plate member on the machine having a plurality of vertically extending cavities therein arranged in a horizontally extending row, said cavities having an inlet adjacent their upper ends and an outlet adjacent their lower ends, a blade at the outlet of each cavity reciprocable in a horizontal plane to open and close said outlet, a blade at the inlet of each cavity reciprocable in a horizontal plane to open and close said inlet, means for alternately reciprocating said blades such that the inlets of the cavities are first opened to fill the cavity with product to a level above the inlets, the inlets are then closed to trap a metered charge of said product in each cavity, the outlets are



then opened to discharge by gravity the metered charge of the product and the outlets are then closed, and including an additional cavity in said plate member extending downwardly therethrough, a vertically extending feed auger having its lower end positioned at the upper end of said additional cavity, means for feeding product to the auger so that when the auger is rotated the product is discharged into said cavity and means for rotating the auger through a predetermined angular extent in timed relation with the opening of the outlets of said first-mentioned cavities whereby to discharge a metered amount of product into said additional cavity upon each actuation of the auger.

4,012,890

MACHINE FOR ENVELOPING ARTICLES WITH PLASTICS FILM

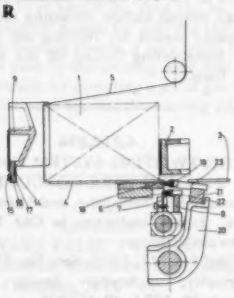
Everhard Bauer, Hudeweg 2, 4700 Paderborn, Germany

Filed Oct. 20, 1975, Ser. No. 624,013

Claims priority, application Germany, Oct. 23, 1974, 2450373

Int. Cl.² B65B 11/16

U.S. Cl. 53—198 R **6 Claims**



1. A machine for enveloping successive articles with plastics film unwound from a supply roll therefor, comprising means defining a horizontal displacement path for each article, means for holding fast the leading end of said film at a holding station beneath said displacement path whereby an upright portion of said film extends through said displacement path, a pusher member for moving said article up to and beyond said upright film portion while said leading end is being held, whereby a loop of said film becomes partially slung about said article while additional film is pulled from said supply roll, a beam movable downwardly towards said holding means at said holding station to complete said loop in a lowered position by engaging the film with its end and bringing an intermediate film portion into juxtaposition with said leading film end while pulling a still further length of said film from said supply roll, a stationary welding bar disposed beneath said displacement path and above said holding means at said holding station, a backing bar carried by said movable beam at one side for cooperating with said welding bar to join the ends of said loop, a percussion knife for severing said loop from said intermediate film portion at a severing station, said holding means being formed by said percussion knife and by a pivotable clamping lever operable to engage one side of said knife with said leading film end clamped therebetween, means for disengaging said clamping lever from said knife, means for moving said knife from said holding station to a position opposite said severing station, means for impelling said knife and said disengaged clamping lever to said severing station whereby said loop is severed, means for re-engaging said clamping lever with said knife side at said severing station to hold a new leading end of film, and means for returning said knife and reengaged clamping lever to said holding station.

4,012,891

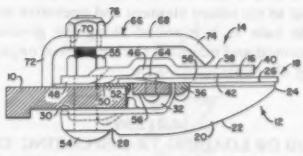
MOWING APPARATUS ADJUSTMENT MEANS

Wilfred LeeRoy Steuerwald, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Feb. 25, 1976, Ser. No. 661,352

Int. Cl.² A01D 55/06

U.S. Cl. 56—305 **11 Claims**



1. In a cutting apparatus of the reciprocating sickle type adapted for cutting standing vegetation and having an elongated frame member generally transverse to the direction of cutting apparatus travel, a plurality of sickle guards having finger portions extending forward from the frame member and cutting edges, fastening means rigidly securing the guards to the frame member, and an elongated reciprocating sickle bar assembly including a plurality of knife sections with angled forwardly converging cutting edges and upper and lower surfaces, each cutting edge intersecting with a cutting edge on the adjacent section at a rearward vertex and registering with the cutting edges of the guards as the sickle bar assembly reciprocates, the combination therewith of an improved holddown means for maintaining the knife sections of the sickle bar assembly in cutting relationship with the guards, and comprising:

a plurality of somewhat resilient holddown plates having rear and forward portions, the rear portions being rigidly secured to said frame member by said fastening means and the forward portions extending over the sickle bar assembly and guards, each forward portion being substantially parallel to and closely adjacent to the upper surfaces of said knife sections and vertically above a finger portion of a guard so as to confine the sickle bar assembly in a cutting relationsip with the guards; and

adjustable bias means, supported by the frame member and structurally separate from but operatively engaging the

holddown plates for selectively biasing the forward portions of the holddown plates downward relative to the rear portions so as to change the distance between said forward portions and the cutting edges of the guards.

4,012,892

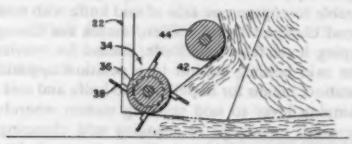
GROUND-ROLLED CYLINDRICAL BALER

Gust Soteropulos, and Gerald Franklyn Meiers, both of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Aug. 20, 1975, Ser. No. 605,987

Int. Cl.² A01D *39/00*

U.S. Cl. 56—341 **13 Claims**



1. A machine for removing crop material from the ground and rolling it into cylindrical bales comprising: a mobile frame having opposite sides; a pickup means mounted on the frame between the opposite sides and including an axially transverse rotary element mounted on a lower rearward portion of the frame adjacent the ground and having generally radially extending pickup elements operatively associated therewith for moving forwardly and upwardly about the axis of the rotary element to engage and elevate crop material lying on the ground; and conveyor means operative to engage crop material elevated by the pickup means and roll it along the ground into a spiral, axially transverse, generally cylindrical bale and including a first roller means adjacently forward and above and parallel to the rotary element and operative to support the rear of the bale as it is rolled along the ground after it is partially formed and maintain the bale out of engagement with the pickup element.

4,012,893

METHOD OF LOADING TRANSPORTING TROLLEYS WITH FULL CANS OR THE LIKE AND SUPPLYING FULL CANS TO SPINNING MACHINES FED WITH FIBER SLIVER AND APPARATUS FOR IMPLEMENTING THE METHOD

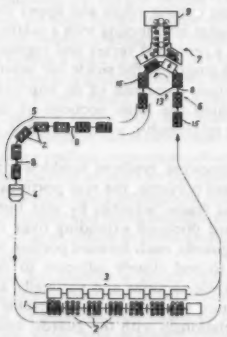
Kurt Weber, Elgg, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Dec. 8, 1975, Ser. No. 638,921

Claims priority, application Switzerland, Dec. 24, 1974, 17269/74

Int. Cl.² D01H *9/00*

U.S. Cl. 57—34 R **8 Claims**



1. A method of loading transporting trolleys with full cans by means of a can loading device and transporting the full cans to a spinning machine fed with fiber slivers and transporting empty cans to the can loading device comprising the steps of:

1. transporting empty cans which have been placed upon transporting trolleys interconnected to form a transporting trolley train from a spinning machine fed with fiber sliver to a can loading device;
2. transporting the empty cans from at least one of the transporting trolleys to a can take-up station;
3. engaging the empty cans at the can take-up station by means of a revolving can transporting device;
4. transporting the empty cans by means of the revolving can transporting device to a spinning preparatory machine delivering fiber sliver;
5. filling the empty cans with fiber sliver at the spinning preparatory machine;
6. transporting the filled cans to a can output station;
7. displacing the filled cans from the can output station onto a transporting trolley of the same transporting trolley train; and
8. then bringing the transporting trolley train in a train configuration back to the spinning machine fed with fiber sliver.

3. An apparatus for loading transporting trolleys with full cans at a first location and transporting them from the first location to a second location containing a spinning machine fed with fiber slivers and transporting empty cans from the spinning machine to the first location for refilling the cans with fiber sliver, said apparatus comprising:

A. a spinning preparatory machine for producing fiber sliver arranged at the first location;

B. a spinning machine fed with fiber sliver arranged at the second location;

C. a can loading station arranged at said first location; said can loading station comprising:

a. shifting means for bringing can transporting trolleys interconnected into a train and provided with empty cans thereon into a desired position for transfer of the empty cans to a can take-up station;

b. means defining a can take-up station located in a position for receiving empty cans transferred from a transporting trolley to said can take-up station;

c. said shifting means including first pusher means for transferring empty cans to the can take-up station;

d. a movable can transporting device for engaging empty cans at the can take-up station and for delivering the empty cans to the spinning preparatory machine for loading the empty cans with fiber sliver;

e. means defining a can output station;

f. said movable can transporting device delivering the cans filled with fiber sliver at the spinning preparatory machine to the can output station; and

g. said can output station including means defining second pusher means for moving the full cans onto an empty transporting trolley of the same transporting trolley train.

4,012,894

CONDUCTOR TWISTING SYSTEM FOR TWISTING A RUNNING WIRE CONDUCTOR

Hisateru Akachi; Hideo Miyajima, and Mitsuro Yaguchi, all of Sagamihara, Japan, assignors to Oki Densen Kabushiki Kaisha, Kawasaki, Japan

Filed Feb. 21, 1975, Ser. No. 551,852

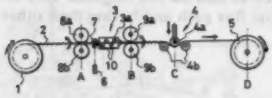
Claims priority, application Japan, Feb. 26, 1974, 49-23130; Sept. 30, 1974, 49-113206

Int. Cl.² H01B *13/04*

U.S. Cl. 57—34 AT **23 Claims**

18. A wire conductor twisting apparatus comprising a feed reel for a wire conductor, a take-up reel for said conductor, a pair of rolls disposed between the reels for imparting twist to the wire conductor passing there through, said rolls rotating in opposite direction with the same peripheral velocity along

axes forming an angle therebetween to permit rectilinear passage of the wire conductor therebetween in rotation, a stress releasing means disposed downstream of the feed reel and upstream of said rolls for releasing internal stess developed in the wire conductor fed from the feed reel, a revolving



means for revolving said stress releasing means in the same direction and speed as the wire conductor, and a rotation arrestor disposed downstream of said rolls for arresting the rotation of the wire conductor, said arrestor being intermittently operable.

4,012,895

FALSE-TWISTING ARRANGEMENT FOR SYNTHETIC YARNS

Edgar Muschelknautz, Leverkusen; Hans Lenz, Dormagen-Hackenbroich, and Heiko Herold, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

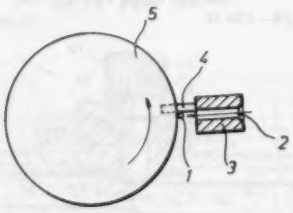
Filed July 10, 1974, Ser. No. 487,078

Claims priority, application Germany, July 24, 1973, 2337527

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² D02G 1/02

U.S. Cl. 57—77.4 **7 Claims**



1. An apparatus suitable for false twisting of synthetic yarn comprising means for twisting of the yarn comprising a movably mounted edge over which the yarn can be drawn for the twisting thereof, take-off means for drawing the yarn over the moving edge of the twisting means, a yarn guide for preventing entrainment of the yarn by the moving edge, the improvement which comprises means for directing a jet of gas or liquid onto the yarn to press the yarn against the moving edge during the twisting thereof.

4,012,896

YARN FALSE TWISTER

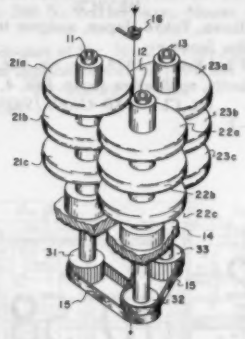
Melvyn Robert Fischbach, Charlotte, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Continuation-in-part of Ser. No. 445,718, Feb. 25, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,873

Int. Cl.² D02G 1/04; D01H 7/92

U.S. Cl. 57—77.4 **22 Claims**

1. In a friction false twist device of the disc type, mounted on three shaft members, the improvement comprising a disc member having an inorganic yarn-engaging surface on the outer periphery thereof, said surface having a hardness greater than 975 on the Knoop$_{100}$ scale and a surface texture of more



than 75 and less than 400 peaks of at least 50 microinches in height per linear inch.

4,012,897

METHOD AND APPARATUS FOR TWISTING YARNS

Junshiro Ogura, Tokyo, Japan, assignor to Ogura Jewel Industry Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,819

Claims priority, application Japan, Mar. 2, 1974, 49-23768

Int. Cl.² D02G 1/08

U.S. Cl. 57—77.4 **2 Claims**

1. A method of twisting yarns, comprising the steps of passing a yarn to be crimped through a pair of opposingly rotating twisting discs in contact with circumferencial faces thereof, said twisting discs being disposed in small gap relation with each other, said gap being smaller than the yarn diameter, for pressingly gripping said yarn therebetween and rotating about the respective rotational axes which are non-parallel to each other and inclined at a predetermined angle in opposite directions relative to the length of input yarn to have the respective circumferencial faces turned toward a yarn gripping position from opposite sides thereof, rotating said twisting discs at slightly different circumferencial speeds, and urging said yarn toward said yarn gripping position.

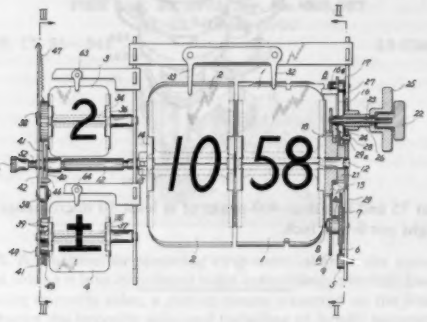
2. An apparatus for twisting yarns, comprising a pair of opposingly rotatable twisting discs disposed in small gap relation with each other for pressingly gripping between the circumferencial faces thereof a yarn to be crimped, said gap being smaller than the diameter of the yarn, and rotatable about the respective rotational axes which are non-parallel to each other and inclined at a predetermined angle in opposite directions relative to the length of input yarn to have the respective circumferencial faces turned toward a yarn gripping position from opposite sides thereof, said twisting discs being driven to rotate at slightly different circumferencial speeds, and guide means for urging said yarn toward said yarn gripping position.

4,012,898

ROTARY INDICATING PLATE TYPE DIGITAL DISPLAY DEVICE

Keiichi Yoshizawa, Tokyo, Japan, assignor to Kabushiki Kaisha Seikosha, Japan

Filed Feb. 4, 1975, Ser. No. 546,898
Claims priority, application Japan, Feb. 4, 1974, 49-14273
Int. Cl.² G04B 45/00, 19/00
U.S. Cl. 58—2 4 Claims



1. In a rotary plate-type digital display device for displaying the time in hours and minutes in digital form: a rotary minute drum; a set of minute-indicating plates containing minute time indicia and disposed around the periphery of said minute drum and being pivotable thereon so that angular movement of said minute drum in the forward direction causes said minute-indicating plates to successively pivot and turn over to thereby successively display the minute increment of time; a rotary hour drum disposed alongside said minute drum; a set of hour-indicating plates containing hour time indicia and disposed around the periphery of said hour drum and being pivotable thereon so that angular movement of said hour drum in the forward direction causes said hour-indicating plates to successively pivot and turn over to thereby successively display the hour increment of time; and drive means for continuously rotating said minute drum in the forward direction to effect successive turning over of said minute-indicating plates at one minute intervals and for intermittently rotating said hour drum in the forward direction to effect successive turning over of said hour-indicating plates at one hour intervals, said drive means comprising a rotatable drum shaft having said minute drum rotatably mounted thereon and having said hour drum fixedly mounted thereon, means for rotationally and continuously driving said minute drum about said drum shaft to individually turn over said minute-indicating plates at successive one minute intervals, and means responsive to the turning over of the 59th minute-indicating plate to effect angular movement of said drum shaft to accordingly advance said hour drum one increment in the forward direction to thereby turn over the next hour-indicating plate synchronously with the turning over of said 59th minute-indicating plate.

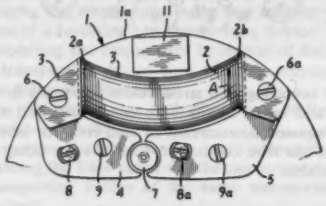
4,012,899

MICRO MOTOR FOR A TIMEPIECE

Eiichi Matsuura, Chiba, and Nobuo Tsukada, Tokyo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Apr. 9, 1975, Ser. No. 566,348
Claims priority, application Japan, Apr. 9, 1974, 49-40344; Apr. 23, 1974, 49-45789
Int. Cl.² G04C 3/00
U.S. Cl. 58—23 D 3 Claims

1. In a timepiece having a timepiece movement having an outwardly curved frame portion: a micro motor comprising a curved magnetic core mounted on the timepiece movement frame portion at the periphery thereof and being curved inwardly in a direction opposite to the outward curvature of said frame portion to define a space between the outwardly curved frame portion and inwardly curved magnetic core, a coil winding wound on said curved magnetic core, a stator comprised of stator pieces each connected at one end to a respective end portion of said curved magnetic core to define therewith a magnetic flux path and having their other ends spaced



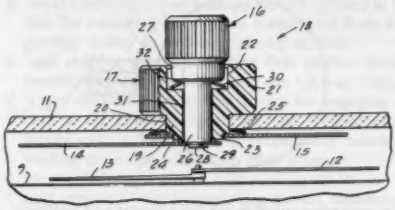
apart and configured so as to form an opening therebetween, said stator pieces having curved portions extending at least partly along the curvature of said curved magnetic core on the side opposite that which defines said space, and a rotor rotatably disposed in said opening; and at least one timepiece component mounted on said timepiece movement within said space thereby conserving space and providing a compact construction.

4,012,900

SETTING MEANS FOR ESTIMATED TIME OF ARRIVAL CLOCK HANDS

Wayne Jay Enright, Delavan, Wis., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Jan. 12, 1976, Ser. No. 648,536
Int. Cl.² G04B 19/28, 47/06
U.S. Cl. 58—126 D 7 Claims



1. A method for setting estimated time of arrival (ETA) minute and hour hands comprising steps of:
a. rotating an ETA hour hand knob less than one-half revolution to set an ETA hour hand; and
b. rotating a minute hand knob less than one-half revolution to set an ETA minute hand without disturbing the ETA hour hand setting.

4,012,901

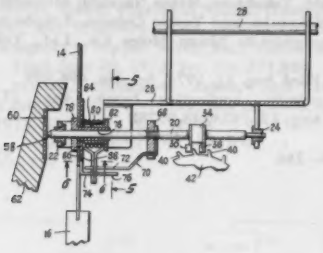
DAMAGE-RESISTANT MECHANICAL METRONOME

Henry Ware Jones, III, New Haven, Conn., assignor to Franz Manufacturing Co., Inc., New Haven, Conn.

Filed Sept. 25, 1975, Ser. No. 616,833
Int. Cl.² G04F 5/02
U.S. Cl. 58—130 R 6 Claims

1. A metronome, comprising in combination:
a. a shaft part,
b. a pendulum part carried by the shaft part and adapted to undergo reciprocating movement about the axis of the shaft part,
c. yieldable drive means connecting said parts to effect

concurrent movement thereof, said drive means including manually engageable, settable means for reducing limp in



the successive half cycles of the reciprocating pendulum, and

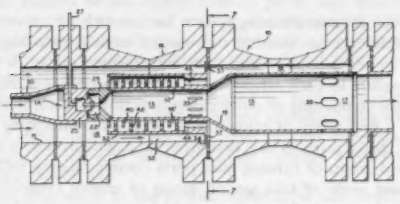
d. powered means for oscillating the shaft part.

4,012,902

METHOD OF OPERATING A GAS TURBINE COMBUSTOR HAVING AN INDEPENDENT AIRSTREAM TO REMOVE HEAT FROM THE PRIMARY COMBUSTION ZONE

Robert M. Schirmer, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 456,180, March 29, 1974, Pat. No. 3,939,653. This application Nov. 18, 1975, Ser. No. 633,051
Int. Cl.² F02C *3/00*
U.S. Cl. 60—39.02 **15 Claims**



1. A method for burning a fuel in a combustor, which method comprises:

introducing a first stream of air into a primary combustion zone of said combustor;

introducing a fuel into said primary combustion zone;

burning said fuel;

introducing a portion of a second stream of air, maintained separate from said first stream of air, into a second zone of said combustor located downstream from said primary combustion zone;

passing a third stream of air, maintained separate from said first and second streams of air, in a downstream direction over and in heat exchange with an outer wall of said primary combustion zone so as to remove heat from the interior of said primary combustion zone and heat said air;

introducing said thus-heated third stream of air into a third zone of said combustor located downstream from said second zone; and

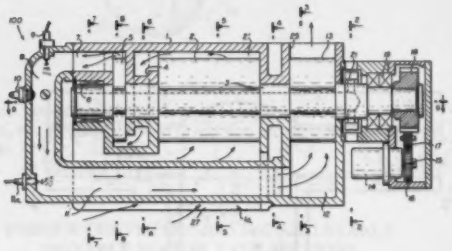
combining another portion of said second stream of air with said heated third stream of air prior to the introduction of said third stream of air into said third zone.

4,012,903

INTERNAL COMBUSTION ENGINE

Frank E. Riedl, 208 N. Terrace Ave., Mount Vernon, N.Y. 10550

Continuation-in-part of Ser. No. 274,790, July 24, 1972, abandoned. This application Oct. 2, 1974, Ser. No. 511,430
Int. Cl.² F02B *53/00*
U.S. Cl. 60—39.45 **13 Claims**



1. An internal combustion engine comprising:

A. A housing having an air inlet opening formed therein;

B. A first set of rotatably mounted interengaging air intake and compression rotor wheels disposed within a chamber in said housing and in communication with the air inlet;

C. A second set of rotatably mounted interengaging compression and metering rotor wheels disposed in another chamber within said housing;

D. A passage defined by said housing and connecting said first set of air intake and compression rotor wheels to said second set of compression and metering rotor wheels;

E. A combustion chamber defined by said housing;

F. A passage defined by said housing and connecting said combustion chamber with said second set of compression and metering rotor wheels, whereby said second set of compression and metering rotor wheels delivers compressed air to said combustion chamber;

G. Means for supplying fuel to said combustion chamber and for initiating combustion of said fuel therein;

H. A third set of rotatably mounted interengaging output rotor wheels disposed in a chamber in said housing in communication with said combustion chamber, wherein combustion gases from said combustion chamber pass through and drive said output rotor wheels, said output rotor wheels having a substantially larger working area than the working area of the second set of compression and metering rotors so that the combustion gases drive the output rotor wheels rather than drive the compression and metering rotor wheels;

I. Means connecting said output rotor wheels with said first set of air intake and compression rotor wheels and said second set of compression and metering rotor wheels whereby said first set of air intake and compression wheels and said second set of compression and metering rotor wheels are driven by said output rotor wheels; and

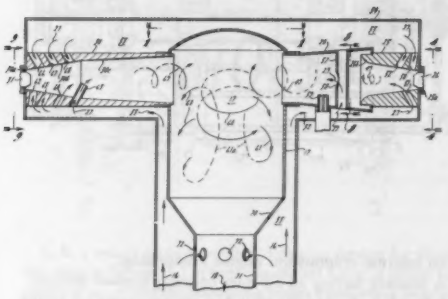
J. An outlet opening defined in said housing and communicating with said output rotor wheels for exhausting the combustion gases,

wherein said first set of air intake and compression rotor wheels have a substantially larger working area than either said second set of compression and metering rotor wheels or said output rotor wheels, whereby a large volume of air is intaken into the internal combustion engine, compressed, and delivered to the combustion chamber.

4,012,904
GAS TURBINE BURNER

Thomas Dushane Nogle, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed July 17, 1975, Ser. No. 596,700
Int. Cl.² F02C 7/22
U.S. Cl. 60—39.65 19 Claims

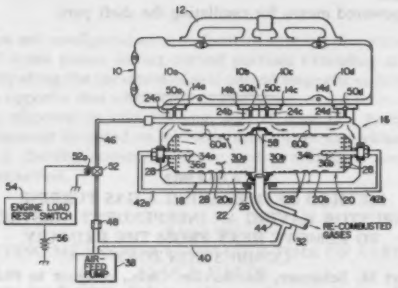


1. In combination, a combustion system for minimizing localized concentrations of fuel and regions of high temperature combustion in lean combustible fuel-air mixtures for a gas turbine engine comprising first stage supply means for supplying first stage fuel and air at predetermined temperatures and rates to effect a lean preheated combustible first stage mixture when thoroughly mixed, first stage premixing means for receiving and thoroughly mixing said first stage fuel and air, a first stage combustion chamber for receiving the first stage fuel and air mixture from said premixing means, igniter means for igniting said mixture in said combustion chamber, ssecond stage supply means for supplying second stage fuel and air at predetermined temperatures and rates to effect a lean preheated mixture when thoroughly mixed that is comparatively cool with respect to the combustion products from said combustion chamber, second stage premixing means for receiving and thoroughly mixing said second stage fuel and air mixture, a second stage combustion chamber for receiving the combustion products from said first stage combustion chamber and also for receiving and burning therein said thoroughly mixed second stage fuel and air mixture, said second stage combustion chamber having upstream and downstream ends and a circular section transverse to the direction between said ends, said first and second stage supply means comprising a source of preheated air and a plurality of air ports in communication with said preheated air and extending angularly through the walls of said first and second stage premixing means to discharge said preheated air thereinto and to effect said thorough mixing of said fuel and preheated air within the corresponding premixing means, means for igniting said second stage mixture and for appreciably inhibiting the rate of NOx formation in said combustion products by quenching the temperature thereof comprising means for comingling said second stage mixture with said combustion products, the last named means comprising means for discharging said second stage mixture and combustion products into said second stage combustion chamber adjacent said upstream end and generally tangentially to the circular section of said second stage combustion chamber to impart a swirl to gas flow in the latter chamber.

4,012,905
EXHAUST CLEANING SYSTEM FOR INTERNAL COMBUSTION ENGINE

Kenji Masaki, Yokohama; Hatuo Nagaishi; Mitinobu Konno, both of Yokosuka, and Yoshio Ookubo, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Aug. 12, 1974, Ser. No. 496,889
Claims priority, application Japan, Aug. 17, 1973, 48-92287; Aug. 17, 1973, 48-92288
Int. Cl.² F01N 3/14
U.S. Cl. 60—286 37 Claims



1. An exhaust cleaning system for use with an automotive multiple-cylinder internal combustion engine including first and second groups of engine cylinders which are to be fired alternately to each other, which system comprises a thermal reactor comprising an outer elongate hollow structure formed with a first group of exhaust inlet ports communicating with the exhaust ports of said first group of engine cylinders and a second group of exhaust inlet ports communicating with the exhaust ports of said second group of engine cylinders; an inner elongate hollow structure which is positioned within said outer elongate hollow structure for forming an elongate space between the outer and inner elongate hollow structures and which is formed with a plurality of openings providing communication between said space and the interior of said inner elongate hollow structure, said interior of the inner elongate hollow structure constituting a re-combustion chamber of the thermal reactor; at least one air-injection nozzle opening in the vicinity of one longitudinal end of said re-combustion chamber and in close proximity to an axis of the inner elongate hollow structure, said first group of exhaust inlet ports being open in the neighbourhood of the longitudinal end portion of the inner elongate hollow structure adjacent said one longitudinal end of the re-combustion chamber; an outlet duct leading from said re-combustion chamber for discharging recombusted gases from the re-combustion chamber; air-supply means for feeding air to said air-injection nozzle; and guide means for guiding a stream of exhaust gases from each of said first group of exhaust inlet ports toward said longitudinal end portion of said inner elongate hollow structure and a stream of exhaust gases from each of said second group of exhaust inlet ports toward an intermediate longitudinal portion of said inner elongate hollow structure.

4,012,906

OVERHEAT PREVENTING SYSTEM FOR EXHAUST GAS PURIFIER OF VEHICLES

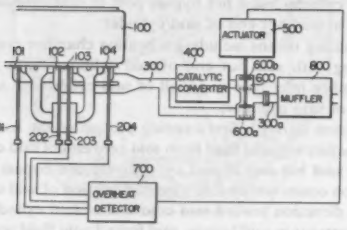
Tadashi Hattori, Nishio; Takamichi Nakase, Gamagori; Hideo Tsubouchi, and Toshiharu Iwata, both of Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed June 20, 1973, Ser. No. 371,880

Claims priority, application Japan, June 26, 1972, 47-63896; July 26, 1972, 47-75399; July 26, 1972, 47-75400; July 26, 1972, 47-75401; July 31, 1972, 47-77155

Int. Cl.² F01N *3/15*; F02B *75/10*

U.S. Cl. 60—277 **5 Claims**



1. An overheat prevention system for an exhaust gas purifier in an internal combustion engine having a plurality of engine exhaust ports comprising:

a temperature detector inserted in the vicinity of each of the engine exhaust ports for detecting the temperature in the vicinity of the engine exhaust ports and for producing an output signal representing the detected temperature;

an overheat detector means connected to receive the output signals of said temperature detectors,

said overheat detector means including

a memory circuit for storing the output of said temperature detector for a predetermined period of time,

a circuit for detecting the amount of temperature drop in the vicinity of the engine exhaust ports, said detecting circuit being connected to said memory circuit and to said temperature detector for comparing an output of said memory circuit with an output of said temperature detector, and

a decision circuit means connected to said temperature drop detecting circuit for producing a misfire signal when the difference between the output of said temperature detector and said memory circuit exceeds a predetermined level; and

means responsive to the misfire signal from said overheat detector for preventing unburned gases produced in the exhaust gases of the engine due to the failure to fire from flowing into an exhaust gas purifier.

4,012,907

EXHAUST APPARATUS

William James Crayton, Portrena, Scotland, assignor to Thomas Buchanan, Canada, a part interest

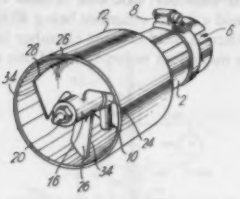
Filed Sept. 24, 1975, Ser. No. 616,367

Claims priority, application Canada, June 9, 1975, 228897

Int. Cl.² F02B *35/00*; F01N *3/02*

U.S. Cl. 60—315 **6 Claims**

1. Device for securement to or incorporating into the exhaust assembly of an internal combustion engine comprising a generally tubular housing open at both ends to enable passage of exhaust gases and a flow of air therethrough, an axle co-axially positioned within the housing on a laterally extending support member, a hub having a longitudinal axis rotatably mounted on the axle, and solely two, opposed, radially extending blades secured to the hub, the blades being obliquely angled with respect to the longitudinal axis of the hub with at least the forward portion of each blade being angled in a plane in the range of 70° to 75°, the forward and rearward portions of each blade extending inwardly providing pointed projections between the forward edge and the forward inner edge, and the rearward edge and the rearward inner edge of the



blade, respectively, the forward edges, and the rearward edges, each defining at said projection an angle in the range of 62° to 72°.

4,012,908

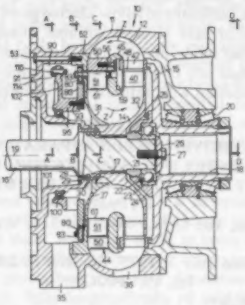
TORQUE CONVERTER HAVING ADJUSTABLY MOVABLE STATOR VANE SECTIONS

Marvin W. Dundore, Rockford, Ill., assignor to Twin Disc, Incorporated, Racine, Wis.

Filed Jan. 30, 1976, Ser. No. 654,046

Int. Cl.² F16D *33/04*

U.S. Cl. 60—354 **8 Claims**



1. In a torque converter:

a housing, a bladed impeller, a bladed turbine, and a stator including a plurality of stator blades, each pair of adjacent stator blades defining a passage through which fluid is circulated from said turbine blades to said impeller blades, each said stator blade having a forward portion and a relatively movable rear portion, said rear portion being adjustably movable to regulate fluid flow through said torque converter to thereby control the power output of said torque converter;

and means for effecting simultaneous movement of said movable rear portions of said stator blades to positions wherein each said passage can be fully open, partially closed or fully closed.

4,012,909

HAMMER

George A. Hibbard, R.D. No. 2, Claremont, N.H. 03743

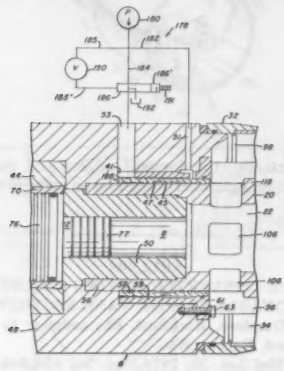
Division of Ser. No. 478,289, June 11, 1974, abandoned. This application Nov. 28, 1975, Ser. No. 636,006

Int. Cl.² F15B *1/02*, *15/18*

U.S. Cl. 60—371 **5 Claims**

1. A fluid operative impacting assembly comprising: an elongated body member having a bore extending longitudinally therein; hammer piston axially movable within said bore

to form two axially spaced variable volume chambers therein; an exhaust chamber carried by said body member; valved passageway means in said body member to control fluid communication between one of said variable volume chambers and said exhaust chamber; said one of said variable volume chambers and said exhaust chamber being adapted to receive hydraulic fluid therein; said exhaust chamber having a volume greater than the maximum volume of said one of said variable



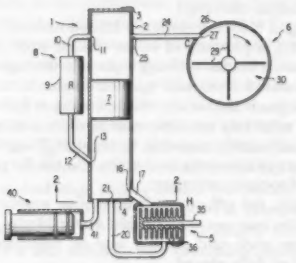
volume chambers; and pump means communicating with said exhaust chamber for removing hydraulic fluid from said exhaust chamber during said axial movement of said hammer piston at a rate sufficient to allow discharge of hydraulic fluid from said one of said variable volume chambers into said exhaust chamber while maintaining minimum back pressure therein when said one of said variable volume chambers in in fluid communication with said exhaust chamber.

4,012,910

THERMALLY DRIVEN PISTON APPARATUS HAVING AN ANGLED CYLINDER BYPASS DIRECTING FLUID INTO A THERMAL LAG HEATING CHAMBER BEYOND THE BYPASS

Mark Schuman, 101 G St., SW., No. 516, Washington, D.C. 20024

Filed July 3, 1975, Ser. No. 592,895
Int. Cl.² F02G *1/04*
U.S. Cl. 60—520 **61 Claims**



1. An energy converter utilizing a compressible fluid comprising:

a cylinder constructed so as to facilitate a substantially cyclical oscillation of a free piston therewithin and along the cylinder axis, said cylinder having a side wall formed to be closely adjacent a side-wall of said piston and forming a loose sliding seal therewith so as to facilitate development of a differential fluid pressure across said piston during said oscillation;

means for heating fluid flowing into one end of said cylinder;

means for feeding cool fluid into the other end of said cylinder, whereby said cylinder has a hot end and a cold end, and said piston oscillates between and separates said hot and cold ends of said cylinder;

means including said fluid heating means and said cool fluid feeding means for sustaining said piston oscillation;

a cylinder bypass connecting said hot end with said cold end, said bypass bypassing a portion, and only a portion, of the axial length of said cylinder, and communicating with said hot end of said cylinder via a hot bypass conduit and communicating with said cold end of said cylinder via a cold bypass conduit;

said hot bypass conduit communicating with said hot end of said cylinder via a hot bypass port in said cylinder side-wall in said hot end of said cylinder;

said heating means including a heating chamber communicating with said hot end of said cylinder via a heating chamber inlet port in a wall of said cylinder in said hot end of said cylinder;

said piston during a first coasting portion of the oscillatory cycle forcing cold fluid from said cold end of said cylinder into said hot end of said cylinder via said bypass as said piston coasts within said bypassed portion of said cylinder in a direction toward said cold end of said cylinder;

a regenerator in said bypass, said forced cold fluid serving to cool said regenerator and being warmed by said regenerator as said fluid is being forced through said bypass toward said hot end of said cylinder;

said hot bypass conduit, said hot bypass port, said heating chamber, and said chamber inlet port all being configured, disposed, and oriented with respect to each other and to said cylinder so that, during said first coasting portion of said cycle, most of said warmed fluid forced through said bypass into said hot end of said cylinder via said hot bypass port: (a) enters said hot end of said cylinder in a substantially defined stream, (b) flows in said substantially defined stream into said heating chamber via said heating chamber inlet port, and (c) is heated by and within said heating chamber; and

means for facilitating a reversal of motion of said piston back toward said hot end of said cylinder so as to commence a second coasting portion of said oscillatory cycle, said piston during said second coasting portion of said cycle forcing hot fluid from said hot end of said cylinder into said cold end of said cylinder via said bypass as said piston coasts within said bypassed portion of said cylinder in a direction toward said hot end of said cylinder, said forced hot fluid warming said regenerator and being cooled thereby;

said side-wall of said piston blocking said hot bypass port so as to commence a hot rebound portion of said cycle following said second coasting portion of said cycle and prior to the first coasting portion of the next cycle of said piston oscillation, said heating chamber communicating with said hot end of said cylinder during a substantial segment of said hot rebound portion of said cycle;

said piston during said hot rebound portion of said cycle compressing fluid within said hot end of said cylinder and within said heating chamber;

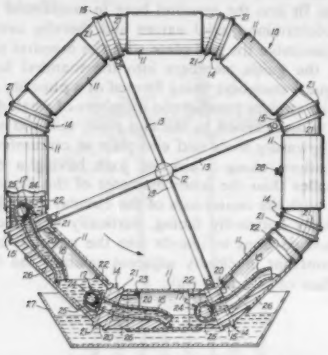
said compressed fluid acting as a compressible fluid spring so as to cause said piston to rebound away from said hot end of said cylinder, and said heating chamber heating said compressed fluid during said hot rebound portion of said cycle so as to augment said spring action such that the kinetic energy of said piston as it rebounds away from said hot end of said cylinder is augmented, thereby providing energy for sustaining said piston oscillation;

whereby a cyclical variation in fluid pressure and temperature is produced within said cylinder, said variation being utilizable for driving a load.

4,012,911
ENGINE POWERED BY LOW BOILING LIQUID

Arnold G. Gulko, 1835 Arcola Ave., Silver Spring, Md. 20902

Filed Mar. 23, 1976, Ser. No. 669,614
Int. Cl.² F03G 3/02
U.S. Cl. 60—531 7 Claims

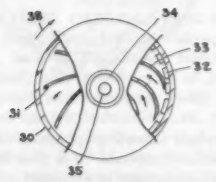


1. An engine adapted to operate upon partial immersion in a heated liquid comprising, a circular train of tubular compartments sealed to interconnectors which join adjacent leading and trailing compartments, some of said compartments containing low boiling liquid for powering said engine and said circular train being tied to a central axle so that rotation of said train will rotate said axle, said interconnectors having an opening and a tube extending forwardly into the leading compartment, and valve means permitting rearward movement through said tube while preventing forward movement through said tube.

4,012,912
TURBINE

Michael Eskeli, 7994-41 Locke Lee, Houston, Tex. 77042

Continuation-in-part of Ser. No. 566,373, April 9, 1975, Pat. No. 3,949,557. This application Jan. 22, 1976, Ser. No. 651,441
Int. Cl.² F01K 25/02
U.S. Cl. 60—682 5 Claims



1. In a power generating turbine, wherein a working fluid is accelerated and pressurized within a rotating rotor first outwardly extending passages, and wherein a working fluid is expanded within a rotating rotor inwardly extending second passages, with the first and the second passages being connected at their outward ends by a passage means to allow said working fluid to flow outwardly within the first passage and through said passage means and inwardly within the second passage, the improvement comprising:

a. a curved inwardly extending second passage, for the generation of thrust and torque on said rotating rotor, with the curvature of said curved inwardly extending passage being backward and away from the direction of rotation.

4,012,913
FRICTION ROCK STABILIZERS

James J. Scott, Lecoma Star Rte., Rolla, Mo. 65401

Filed Oct. 3, 1975, Ser. No. 619,214
Int. Cl.² E21D 21/00, 20/00
U.S. Cl. 61—45 B 13 Claims

1. A friction stabilizer for installation in a structure such as a roof or side wall of a mine shaft or other underground opening for anchoring the structure, said stabilizer comprising a generally annular body having longitudinally extending portions which overlap circumferentially of said body, said body being of dimension predetermined to be substantially larger than the diameter of the bore in which it is to be inserted such that insertion of said body in such bore causes substantial circumferential compression of said body, said overlapping portions of said body being relatively movable circumferentially of said body to permit such substantial circumferential compression of said body, the stabilizer being free of structure precluding said substantial circumferential compression of said body, and said body being of material permitting its said substantial compression during its said insertion and, after such insertion, causing the body outer circumference to frictionally engage the wall of the bore for frictionally anchoring the structure and wherein said body is defined by inner and outer circumferential walls formed of a single thickness of said material, which inner and outer walls, in cross-section, are of common annular configuration; said inner and outer walls each having a prescribed, common discontinuity which extends, uniformly, fully longitudinally of said body; and said discontinuities of said inner and outer walls are spaced apart, one from the other thereof, circumferentially of said body.

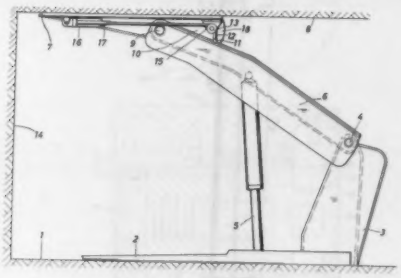
4,012,914
MINE ROOF SUPPORT

Karl Heinz Wehner, Castrop-Rauxel, Germany, assignor to Klockner-Werke AG, Duisburg, Germany

Filed Jan. 22, 1976, Ser. No. 651,469
Claims priority, application Germany, Apr. 22, 1975, 2517732
Int. Cl.² E21D 15/44
U.S. Cl. 61—45 D 10 Claims

1. A mine roof support, for use in a mine gallery of underground excavation having a floor, a roof and a mine face, comprising a support member adapted to rest on the floor of a mine gallery and having a front end to be directed towards the mine face and a rear end; a first shield fixed to and projecting upwardly from said rear end of said support member; a second shield having an upper and a lower end and being pivotally connected to said lower end to the upper end of said first shield and extending inclined with respect to the latter towards the mine face, said second shield having an upper surface facing the roof of the mine gallery; expandable and collapsible prop means pivotally attached at opposite ends to said support member and said second shield between opposite

ends of the latter; a cap having a top face adapted to engage the roof of the mine gallery and a bottom face, said cap being pivotally attached intermediate its ends to said upper end of said second shield and having a front end directed toward the mine face and a rear end so as to form a wedge-shaped free space between the portion of the bottom face of the cap located rearwardly of the point of its attachment to said second shield and the upper surface of the latter; and means for preventing entrance of loose rock material into said space,



including a tear resistant flexible web connected at one end to said upper surface of said second shield, guide means connected to said cap in the region of the rear end of the latter, said web extending over said guide means along the bottom face of the cap toward the front end of the latter, and means for maintaining the web under tension, including at least one cylinder and piston means mounted in the region of said front end of said cap and having a piston rod connected to the other end of said web.

4,012,915

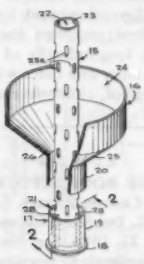
DRIVING TIPS FOR FORMING CAST-IN-PLACE CASELESS CONCRETE PILES

Luis Poma, San Salvador, El Salvador, assignor to Interpile USA, Inc., New Orleans, La.

Filed July 18, 1975, Ser. No. 597,090

Int. Cl.² E02D 5/72

U.S. Cl. 61—53 **7 Claims**



1. A driving tip member for use with a vertically elongated hollow driving mandrel to be driven into the earth by pile driving equipment and thereby produce a vertically elongated pile-forming hole for forming a cast-in-place caseless pile of fill material or the like which is introduced in flowable condition into the hole and sets upon curing, and wherein the driving mandrel is an elongated tubular cylinder having an annular cylindrical tube wall surrounding an axial bore therethrough and terminating in a lower end portion of predetermined outer diameter, the diameter of the mandrel being sufficiently smaller than the diameter of the pile-forming hole to be formed to provide both an outer annular surrounding space about the mandrel and an inner cylindrical space within the mandrel into which gravity flow of the fill material downwardly about and within the mandrel will occur, the driving tip member comprising a rigid lower leading end plate of substantially planiform configuration and circular cross-section of a diameter corresponding to the desired pile diameter and larger than the outer diameter of the mandrel lower end portion to be releasably assembled therewith, and a plurality of laterally spaced mandrel interfitting centering guide members carried by the end plate and rising perpendicularly from the end plate to fit into the mandrel bore in concentric relation over a predetermined axial extent and thereby center and releasably assemble the end plate with the mandrel solely by interfitting the guide members into the mandrel bore, the centering guide members being formed of a plurality of more than two like straight parallel rod members of small diameter assembled to and carried by the end plate, said rod members extending upwardly from said end plate at circumferentially spaced locations along a circular path having a diameter slightly smaller than the inner diameter of the mandrel and concentric with the center axis of the circular end plate providing radially outwardly facing, vertically elongated abutment surface portions to interfit into the mandrel bore and inwardly confront in closely adjacent relation the inwardly facing surface of said tube wall.

4,012,916

APPARATUS FOR CONSTRUCTING UNDERGROUND TUNNELS

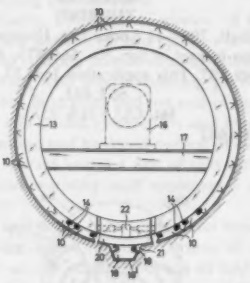
Hans Jütte, Dortmund Brechten; Adolf Foik, Munich; Siegmund H. F. L. M. Babendererde, Bad Vilbel, and Reinhard E. J. Bokemeyer, Offenbach, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen and Hochtief AG, Frankfurt, both of, Germany

Filed Dec. 10, 1975, Ser. No. 639,518

Claims priority, application Germany, Dec. 23, 1974, 2461241

Int. Cl.² E01G 3/02

U.S. Cl. 61—85 **3 Claims**



1. In an underground tunneling apparatus of the type comprising a drive shield composed of a plurality of elongate members arranged side-by-side in a parallel configuration and generally around the axis of said tunnel, a frame for supporting and guiding said members for longitudinal displacement, a drifting floor cutter movable with the drive shield and operable to cut a channel in the floor in said tunnel, and means for causing relative displacement between said drive shield and said drifting floor cutter, the improvement comprising:

a guide provided on the frame and slidably contacting and guiding the floor cutter for movement in relation to the drive shield and parallel to the longitudinal axis of the tunnel;

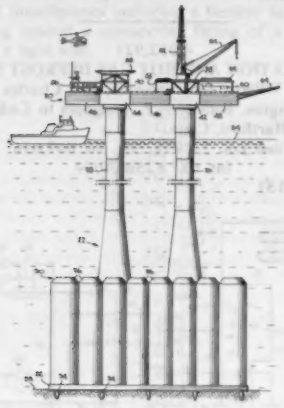
pivoting means for defining a vertical pivot axis about which said floor cutter can be rotated; and

rotating means for rotating said floor cutter about said vertical pivot axis to effect steering of said drive shield.

4,012,917
BRIDGE BEAM TOWER ERECTION METHODS AND APPARATUS

George J. Gendron, Houston, Tex., assignor to Raymond International Inc., Houston, Tex.

Filed Oct. 6, 1975, Ser. No. 620,253
Int. Cl.² B63B *35/44*
U.S. Cl. 61—91 27 Claims



1. A method of erecting an offshore tower, said method comprising the steps of positioning a template, having a plurality of spaced apart vertical legs, on a sea floor so that said vertical legs extend up above the sea level, said template being provided with at least one open framework bridge beam connected to and extending between the upper ends of said vertical legs, floating a platform out to the thus positioned template and locating the platform so that it is adjacent the template legs and is under and in alignment with said bridge beam, thereafter interconnecting jacking units, comprising jacking leg means and jacking mechanism means and operative to undergo longitudinal movement with respect to said jacking leg means, between said bridge beam and the thus located platform so that one of said means is connected to said bridge beam and the other of said means is connected to said platform and operating said jacking mechanisms means to raise said platform clear of the water.

4,012,918
SUBMARINE CABLE LAYING SYSTEM

Kinya Suzuki; Kenji Mori, both of Tokyo; Yasuo Takeuchi; Masao Torii, both of Yokohama; Hiroji Takahashi, and Ryozo Yamaichi, both of Tokyo, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo; Sumitomo Electric Industries, Ltd., Osaka and Nippon Electric Company, Ltd., Tokyo, all of, Japan

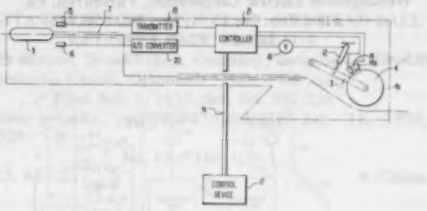
Filed July 3, 1975, Ser. No. 593,134
Claims priority, application Japan, Oct. 2, 1974, 49-114236
Int. Cl.² E02F *5/14*; G05B *11/16*; G05D *3/04*, *15/01*
U.S. Cl. 61—107 8 Claims

1. In a submarine cable laying system comprising a cable laying device towed along the sea-bottom by a cable laying ship and a controlling device on the cable laying ship, said cable laying device comprising a cable depressing wheel and a mechanism responsive to said controlling device for elevating and lowering said cable depressing wheel, the improvement comprising:

first detecting means on said cable laying device for detecting the passage of repeaters and the like under said cable depressing wheel and producing a first signal,

second detecting means on said cable laying device for detecting the length of a part of the cable having been laid by said cable laying device after detection of the passage of a repeater and the like by said first detecting means and producing a second signal, and

control circuit means connected to receive said first and

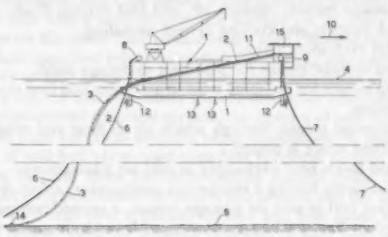


second signals for generating control signals to said controlling device to cause the automatic elevation and lowering of said cable depressing wheel each time a repeater and the like passes under said cable depressing wheel.

4,012,919
METHOD FOR RAPIDLY LAYING A PIPELINE IN DEEP WATER BY AN ANCHORED LAYING MEANS, AND THE RELATIVE DEVICES

Giovanni Rosa, San Donato Milanese; Claudio Morelli, Bologna; Pasquale Brando, San Donato Milanese, and Giuseppe Daghetti, Segrate (Milan), all of Italy, assignors to Saipem S.p.A., Milan, Italy

Filed Sept. 29, 1975, Ser. No. 617,734
Int. Cl.² F16L *1/00*
U.S. Cl. 61—108 2 Claims

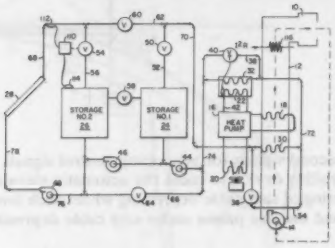


1. The method of rapidly laying a pipeline in a deep body of water by floating laying means having a bow and a stern and provided with a launching ramp, winches mounted on the bow and stern, respectively, of the laying means, cables extending from the laying means to anchors at the bottom of the body of water and adapted to hold the laying means in a selected position and windable on their associated winches to rapidly move the laying means longitudinally to a new position in the laying direction for a distance equal to the length of a piece of pipe to be added to the pipeline, and variable blade-variable speed azimuth propulsors mounted on the bottom of the laying means, wherein the improvement comprises, counteracting the central elastic force which induces an oscillatory motion in the floating laying means when it is moved to a new position by automatically measuring the forces to which the laying means is subjected as it is moved to that new position, and feeding the values so obtained to a computer programmed to regulate the forces exerted by the respective winches on their associated cables and the thrust exerted by the azimuth propulsors so as to rapidly dampen the amplitude of said oscillatory motion.

4,012,920
HEATING AND COOLING SYSTEM WITH HEAT PUMP AND STORAGE

Herbert S. Kirschbaum, Wilkins Township, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 18, 1976, Ser. No. 658,946
Int. Cl.² F25B *27/00*
U.S. Cl. 62—2 **16 Claims**



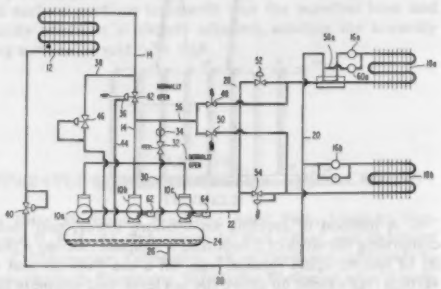
1. A heating and cooling system including:
a heat exchange fluid;
first storage means for siad heat exchange fluid;
air passage means through which air to heat and cool the served space is passed;
a heat pump having a refrigerant compressor, a first refrigerant coil in said air passage means, a second refrigerant coil in heat exchange relation with outdoor air, a third refrigerant coil for exchanging heat with said fluid, and refrigerant line means connecting said compressor to said three coils;
valve means in said refrigerant line means for connecting any one of said three coils to operate as either an evaporator or a condenser and for connecting either one of the other two coils to operate as a condenser or evaporator, respectively, so that heat can be exchanged in any combination between air in said passage means, outdoor air, and said storage fluid.

10. A heating and cooling system including:
a heat exchanger fluid;
a first storage means for said heat exchange fluid;
pump means for pumping fluid to and from said first storage means;
air passage means through which air to heat and cool the served space is passed
a fluid-to-air heat exchanger in said air passageway;
a heat pump having a refrigerant compressor, a first refrigerant coil in said air passage means, a second refrigerant coil in heat exchange relation with outdoor air, a third refrigerant coil for exchanging heat with said fluid, and refrigerant line means connecting said compressor to said three coils;
a fluid-to-refrigerant heat exchanger incorporating said third refrigerant coil;
fluid line means connecting said first storage means, said pump means, and said two heat exchangers, said fluid line means including valve-controlled bypass lines around both of said heat exchangers;
means to control the flow fluid between said first storage means and said heat exchangers in accordance with temperature conditions and the operating mode of said heat pump;
valve means in said refrigerant line means for connecting any one of said three coils to operate as either an evaporator or a condenser and for connecting either one of the other two coils to operate as a condenser or evaporator, respectively;
said refrigerant line valve means having operating positions during a cooling season under one load condition in which said first coil functions as an evaporator and said second coil as a condenser, under a second load condition in which said third coil functions as an evaporator to cool said storage fluid and said second coil as a condenser, under a third load condition in which said first coil functions as an evaporator and said third coil as a condenser to transfer heat from the served space to the storage fluid, and under a fourth load condition in which said third coil functions as an evaporator and said second coil as a condenser to transfer heat from said storage fluid to the outdoor air.

4,012,921
REFRIGERATION AND HOT GAS DEFROST SYSTEM

Benjamin R. Willitts, Lawrenceville, and Charles W. Klossman, Burlington, both of N.J., assignors to Emhart Industries, Inc., Hartford, Conn.

Filed Jan. 7, 1976, Ser. No. 647,016
Int. Cl.² F25B *39/04*
U.S. Cl. 62—151 **14 Claims**



1. A refrigeration and hot gas defrost system comprising:
a. a compressor means for compressing gaseous refrigerant;
b. a condenser means for condensing hot gaseous refrigerant received from said compressor means;
c. a discharge line communicating the output of said compressor means to said condenser means;
d. a plurality of expansion valves;
e. a plurality of evaporator means associated with each of said expansion valves;
f. a liquid line for passing the liquid refrigerant from the output of said condenser means to said expansion valves and said evaporator means;
g. a return line connecting said evaporator means to the input of said compressor means;
h. receiver means for holding a sufficient amount of refrigerant to assure efficient operation of the system;
i. a bypass line providing refrigerant flow between said liquid line and said receiver means;
j. defrost means for selectively passing hot refrigerant gases through at least one of said evaporator means to defrost the same; and
k. a balancing line responsive to a pressure within said receiver greater than within said discharge line to provide fluid flow communication therebetween to equalize refrigerant pressure between said receiver and said discharge line.

4,012,922
AIR COOLING EQUIPMENT FOR COOLING CONTAINERS

Georg Falensky, Hamburg, Germany, assignor to Grunzweig & Hartmann und Glasfaser AG, Ludwigshafen, Germany

Filed Aug. 11, 1975, Ser. No. 603,890
Claims priority, application Germany, Nov. 29, 1974, 2456477
Int. Cl.² B63B *25/26*
U.S. Cl. 62—240 **6 Claims**

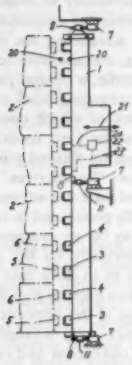
1. An air-cooling arrangement for cooling a single stack of

containers in a hold of a ship wherein each container includes at least two connecting fittings on one side thereof to permit entry of cooling air and exit of exhaust air, said arrangement comprising:

a. a vertically disposed column,

b. means mounting said column for movement along a horizontal path,

c. a plurality of connecting mouthpieces fixedly arranged along and projecting from one side of said column, each of said mouthpieces including a flexible sealing ring for pressing against a connecting fitting of a container to create a tight seal,



d. a plurality of ducts arranged within said column for directing cooling air and exhaust air through respective of said connecting mouthpieces, and

e. means for displacing said column towards and away from a single stack of containers along said horizontal path,

f. whereby said mouthpieces may simultaneously be pressed against all of said connecting fittings of all of said containers in a stack to circulate cooling air through said containers when said column is moved towards said stack and disconnected from said fittings when said column is moved away from said stack.

4,012,923

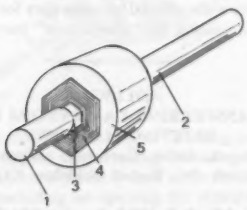
VIBRATION DAMPING COUPLING

Bengt Lundgren, Ulricehamn, Sweden, assignor to SKF Nova A.B., Goteborg, Sweden

Filed Nov. 6, 1975, Ser. No. 629,300

Int. Cl. F16d *3/17*

U.S. Cl. 64—11 R **10 Claims**



1. A coupling for transmitting torque between at least a pair of rotatable members, said members having spaced apart, complementary peripheral surface portions of non-circular cross section, coupling means comprised of elastomer and metal layers and consisting of at least two sections in abutting side by side relation, one surface portion of said coupling means abutting the peripheral surface portion of one of said members and another surface portion of said coupling means abutting the peripheral surface portion of said other member whereby rotation of one member effects through said coupling means rotation of said other member.

4,012,924

CONSTANT VELOCITY UNIVERSAL JOINT AND BALL RETAINER CAGE THEREFOR

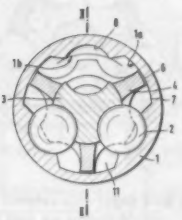
Werner Krude, Neunkirchen, Germany, assignor to Lohr & Bromkamp GmbH, Offenbach (Main), Germany

Filed July 1, 1975, Ser. No. 592,238

Claims priority, application Germany, July 11, 1974, 2433320

Int. Cl. F16d *3/30*

U.S. Cl. 64—21 **6 Claims**



1. A constant velocity universal joint comprising an outer joint element having a bore therethrough and a plurality of grooves in the surface of said bore, an inner joint element within said bore and having a plurality of grooves in its outer surface corresponding in number to and opposed from said outer joint element grooves to define pairs of opposed grooves, a plurality of balls between said joint elements with each ball being in a pair of opposed grooves, a cage between said joint elements and having a plurality of radial openings therein to retain said balls in a plane which is perpendicular to the axis of the cage and which bisects the angle between the joint elements, said cage having a first spherical surface on its outer face and a second spherical surface on its inner face, means on the inner face of said outer joint element coacting with said cage first spherical surface for guiding said cage with respect to said outer joint element, said inner joint element having convex spherical outer surface means for coacting with said cage second spherical surface, the centers of said first and second cage spherical surfaces being equidistant on opposite sides of said ball plane, said cage first spherical surface comprising at least three circumferentially spaced guide ridges thereon each positioned between a pair of balls and the diameter of said cage first spherical surface and said guide ridges being greater than the smallest diameter of said bore within said outer joint element, said outer joint element bore having a plurality of second grooves therein corresponding in number and spacing to said guide ridges and each second groove being between two ball grooves, said second grooves having a diameter corresponding to the diameter of said cage first spherical surface so that said cage is guided by coaction of its said guide ridges in said second grooves.

4,012,925

CONSTANT VELOCITY TORQUE TRANSMITTING JOINT

Werner Krude, Neunkirchen, Germany, assignor to Löhr & Bromkamp GmbH, Offenbach, Main, Germany

Filed Dec. 11, 1975, Ser. No. 639,752

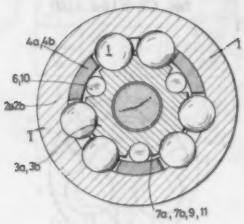
Claims priority, application Germany, Dec. 23, 1974, 2461289

Int. Cl.² F16D *3/30*

U.S. Cl. 64—21 **5 Claims**

1. A constant velocity torque transmitting joint comprising an outer joint element having a bore therethrough and a plurality of grooves in the surface of said bore, an inner joint

element within said bore and having a plurality of grooves in its outer surface corresponding in number to said outer joint element grooves to define pairs of opposed grooves, a plurality of balls between said joint elements with each ball being in a pair of opposed grooves, a cage between said joint elements and having a plurality of openings therein to retain said balls in a plane which is perpendicular to the axis of the cage and which bisects the angle between the joint elements, said cage having a first spherical surface on its outer face and a second spherical surface on its inner face, means on the inner face of said outer joint element co-acting with said cage first spherical



surface for guiding said cage with respect to said outer joint element, alignment control means on said inner joint element supporting and guiding said cage second spherical surface, the centers of said first and second cage spherical surfaces being equidistant on opposite sides of said ball plane, there being a plurality of circumferentially spaced recesses in said inner joint element between the grooves therein, said alignment control means comprising a plurality of control elements within said plurality of spaced recesses, the centers of said control elements and the center of said cage second spherical surface being located in a common plane.

4,012,926

CAM CARRIAGE IN DUAL-BED HAND KNITTING MACHINE

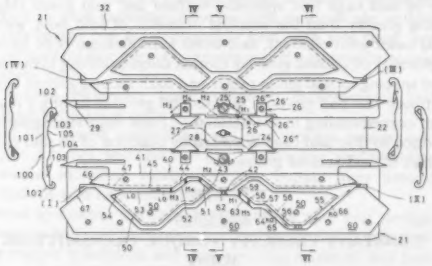
Fuji Koike, 2006-143 Aza-Sakaine Oaza-Minami, Tempaku-cho, Showa, Nagoya, Aichi, Japan

Filed May 19, 1976, Ser. No. 687,864

Claims priority, application Japan, June 24, 1975, 50-78239; June 24, 1975, 50-78240; June 24, 1975, 50-87369[U]; June 24, 1975, 50-78241

Int. Cl.² D04B *7/06*

U.S. Cl. 66—63 **8 Claims**



1. A hand knitting machine for pearl knitting comprising two needle beds arranged opposedly and spacedly in a horizontal plane, each of said beds having a plurality of vertical needle grooves, and a manually actuatable cam carriage having a yarn feeder at the center thereof either transversely or vertically and two cam arrangement base members to be transversely reciprocated astride and along said two beds, each of said base members having on the reverse side thereof two passages defined by a plurality of cam plates and extending along the transverse length thereof symmetrically in respect of said central yarn feeder, so that when actuating said carriage a plurality of double hook latch needles arranged respectively in said needle grooves are successively subjected to vertically forward and rearward movement along the respective needle groove according to engagement of every latch cleared hook on one side of the needle directly with any of said passages, whereby every opposite side hook may be subjected to knitting operation on the opposite needle bed and beneath the opposite cam arrangement base member, wherein the improvement lies in the cam carriage comprising;

four needle latch passages arranged symmetrical either transversely or vertically in respect of said central yarn feeder, each having an entrance, a forwardly inwardly slanted part for advancing the needle to cause "latch-over" movement, a rearwardly inwardly slanted part for retracting the needle, a central part so located that when the passage cam engaging hook of the needle lies therein the opposite hook of which concerned latch is cleared may face just at the yarn feeder for receiving yarn, a rearwardly outwardly slanted part for further retracting the needle to cause "knock-over" movement, a forwardly outwardly slanted part for advancing the needle, and an exit symmetrically positioned in relation to said entrance, said exit being to be an entrance of the other passage arranged symmetrically on the same cam arrangement base member so as to have said central part commonly and for the needles each to pass therethrough when actuating the carriage in the opposite direction;

four pairs of symmetrically arranged guide members, each provided at the outermost end of said cam arrangement base member and having inwardly convergent guide faces therebetween so as to bring the passage cam engaging hook of the needle eventually not in the vertically correct position in the concerned needle groove correctly to said passage entrance;

four symmetrically arranged members for clearing the needle latch on the passage cam engaging hook side, each having a transversely outwardly pointed portion and provided at the concerned passage entrance so as to clear the eventually closed latch; and

two symmetrically arranged pivoted arm members, each pivoted between said yarn feeder and said yarn receiving central part of the passage so as to be freely angularly moved by substantially 180° between the two positions in either of which the inner side of the transversely elongated arm is substantially parallel to the carriage travel direction, whereby when said arm member is in its operative position in which the arm member extends in the direction opposite to the carriage travel, the inner side of said arm member abuts on the knitting operation hook so as to correctly guide the passage cam engaging hook from the central yarn receiving passage part into the rearwardly outwardly slanted passage part for retracting the needle and causing the "knock-over" movement.

4,012,927

LOOP TRANSFERRING CAM SYSTEM FOR FLAT KNITTING MACHINES

Gottfried Kühnert, Aalen, Germany, assignor to Universal Maschinenfabrik Dr. Rudolf Schieber KG, Westhausen, Germany

Filed Sept. 9, 1975, Ser. No. 611,757

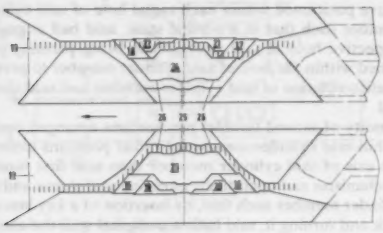
Claims priority, application Germany, Sept. 10, 1974, 2443231

Int. Cl.² D04B *7/00, 15/36, 35/00*

U.S. Cl. 66—78 **4 Claims**

1. In a flat knitting machine having opposed needle beds including a plurality of latch-type needles having rigid loop expanders secured thereto and a carriage traversible along said beds including cam means for knitting and for transferring loops from the needles of one needle bed to the needles

of the other needle bed during the traverse of the carriage, said cam means comprising a pair of cam sets on the carriage cooperable with the needles of each needle bed respectively, each of said cam sets including a transfer cam having a higher nose for expanding the loops and a following lower nose for transferring the loops, the improvements comprising each cam set including a transfer cam having at least three noses which are consecutive in the direction of traverse of the carriage and having depressions of equal depth between adjacent noses, said transfer cam including speed a complementary opposed



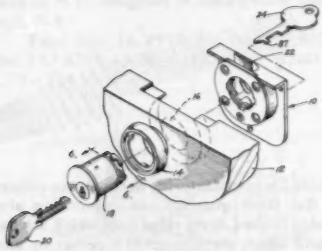
cam for camming the needles into each depression, said three noses including at least one higher nose followed by at least one lower nose for opposite directions of traverse by said carriage and receiving cams adapted to lift the receiving needles associated with said transfer cam in the opposite cam set for both directions of traverse by said carriage whereby the lower nose following said higher nose for each direction of traverse is adapted to left the needles from which loops are to be transferred high enough for the closed latches of the needles which are to receive the loops to be opened by the loops as they slide over the receiving needles.

4,012,928

CYLINDER RETENTION MECHANISM

Robert L. Dauenbaugh, Rockford, Ill., assignor to Keystone Consolidated Industries, Peoria, Ill.

Filed Feb. 27, 1976, Ser. No. 662,153
Int. Cl.² E05B *65/44, 9/06*
U.S. Cl. 70—81 **10 Claims**



1. In a lock device of the type including a housing and a removable cylinder, said housing including a bolt slidable between a projected position and a retracted position, said housing also including an opening for receipt of part of the lock cylinder, said lock cylinder including a member for drivingly engaging the bolt when said lock cylinder is retained with said housing, the improvement of means for retaining the lock cylinder in the housing comprising, in combination:

a retainer ring extending at least partially, circumferentially about the opening;

means including a shifter mounted in the housing engageable with the ring for rotating said ring between a first locked position and a second unlocked position;

one of said cylinder and said ring including at least one projecting tab; and

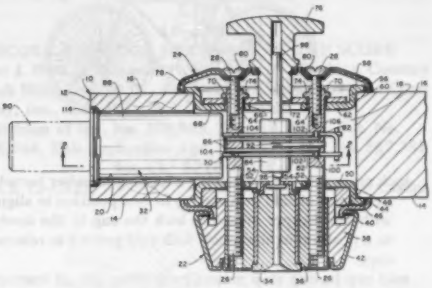
the other of said cylinder and said ring including at least one channel for receipt of said tab whenever said cylinder is in the locked position whereby said ring and said cylinder may be rotated relative to each other to unlock said cylinder from said housing.

4,012,929

LATCH CONSTRUCTION WITH IMPROVED ANTI-VIOLATION FEATURES

Paul G. Solovieff, Tustin, Calif., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed May 19, 1976, Ser. No. 687,989
Int. Cl.² E05B *9/04;* **E05C** *1/06*
U.S. Cl. 70—134 **18 Claims**



1. In a latch construction of the type for mounting in doors and the like with a bolt extendable from a door edge, a latch driving mechanism mounted within the door operably connected to said bolt movable for moving said bolt between extended and retracted positions, an exterior operator assembly projecting outwardly from an exterior door face at a transverse opening through the door including a lock frame mounting a lock cylinder telescoped by a surrounding annular cover inwardly abutting said exterior door face around said door opening, an interior operator assembly projecting outwardly from an interior door face at said door opening including an interior operator and an annular cover inwardly abutting said interior door face around said door opening, said lock cylinder of said exterior operator assembly and interior operator of said interior operator assembly being operably connected to said latch driving mechanism for selectively moving said latch driving mechanism, and fastening means engaged between said lock frame of said exterior operator assembly and said interior operator assembly retaining assembly of said exterior and interior operator assemblies with said latch driving mechanism and said door; the improvements comprising: said interior operator assembly further including a separate interior reinforcing plate transversely spanning said door opening and edge abutting said interior door face; said fastening means including primary fasteners operably engaged with said interior reinforcing plate securing said lock frame of said exterior operator assembly directly to said interior reinforcing plate, secondary fasteners directly engaged with ends of said primary fasteners and operably engaged with both said interior operator and said cover of said interior operator assembly securing said interior operator and said cover directly to said primary fasteners.

4,012,930

LOCKS

Everett H. Benson, Rte. 1 Box 429, Eagle Creek, Oreg. 97022

Filed Oct. 24, 1975, Ser. No. 625,511
Int. Cl.² E05B *71/00;* **B62H** *5/00*
U.S. Cl. 70—234 **4 Claims**

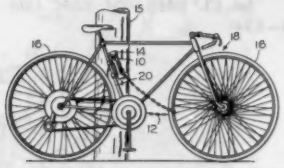
1. In an improved lock,

a chain having links of a predetermined width and a predetermined thickness,

a tubular container open at one end and having a pair of slots extending from said end a predetermined distance and of a width sufficient to permit the links to be moved edgewise thereinto and sufficiently narrow to prevent the links adjacent to links in the slots from moving through the slots,

a cap adapted to fit over the open end portion of the container to close the open ends of the slots to trap the links in the slots,

means on one end of said tubular cylinder providing keeper means and at least one circumferentially displaced groove,



lock means on the cap having a locking member turnable on operation of said lock means from a position in alignment with said keeper means to lock the cap to the container, to a position in alignment with said groove to release said cap,

said cap having stop means projecting into at least one of said slots to preclude turning of the cap relative to the container, and

an anchoring member non-rotatably engaging said lock means and said stop means to preclude rotation of said lock means relative to said tubular container,

the container serving to receive the chain and store it when the chain is not used for securing purposes.

4,012,931

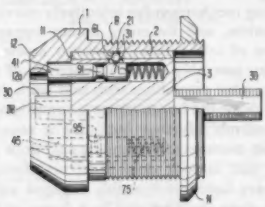
TUMBLER LOCK

Kouichi Harunari, Kagoshima, Japan, assignor to Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1976, Ser. No. 648,705

Int. Cl.² E05B *27/08*

U.S. Cl. 70—363 **4 Claims**



1. A tumbler lock, comprising:

a hollow cylinder casing,

a sleeve concentrically received within said casing and secured thereto,

a cylinder member rotatably supported within said sleeve and coaxial therewith,

the improvement comprising:

a first tumbler mechanisms including a plurality of circumferentially spaced holes at a common axial position within at least the inner peripheral surface of said sleeve,

a corresponding number of radially extending, circumferentially spaced holes of somewhat larger diameter at positions within said cylinder member corresponding to the holes of said sleeve,

bottomed holes extending longitudinally within said cylinder parallel to its axis from one end thereof and intersecting said radially extending holes within said cylinder,

a biasing spring in the bottom of,

each bottomed hole within said cylinder member,

a tumbler pin slidably mounted within a corresponding bottomed hole, said tumbler pins being formed with an annular groove at different axial positions,

a ball of a diameter less than the diameter of the radially extending holes within said cylinder member but greater than the diameter of the corresponding holes within the sleeve positioned within each radial hole of said cylinder member such that in a normal state, said ball engages a respective hole of said sleeve while being partially positioned within the hole of said cylinder member to prevent relative rotation of said cylinder member and said sleeve, and

a plurality of second tumbler mechanisms arranged coaxial within said cylinder member at radial positions closer to the axis of said cylinder member than said first tumbler mechanisms and operatively engaging said sleeve and said cylinder member such that, by insertion of a key into said lock and turning it, said balls are aligned with the annular grooves of said tumbler pins of said first tumbler mechanism and are disengaged from the holes of said sleeve and said second tumbler mechanisms are shifted axially to a position to release said cylinder member with respect to said sleeve to permit relative rotation between said cylinder member and said sleeve.

4,012,932

MACHINE FOR MANUFACTURING HERRINGBONE-PLEATED STRUCTURES

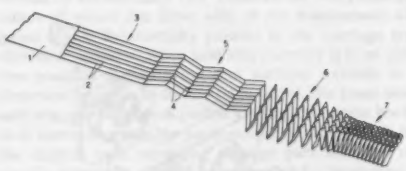
Lucien Victor Gewiss, Vernon, France, assignor to Marc Wood S.A., Paris, France

Filed June 5, 1975, Ser. No. 584,125

Claims priority, application France, June 6, 1974, 74.19523

Int. Cl.² B21D *5/16*

U.S. Cl. 72—187 **17 Claims**



1. A machine for manufacturing herringbone-pleated structures from flat sheet material and comprising alternating transverse folds located along ridge lines which are parallel to each other and which are connected together by alternating longitudinal folds, said machine comprising:

a pair of endless forming assemblies each supporting folding elements engagable with opposite sides of at least one strip of sheet material, said folding elements being positioned and shaped to establish a roughed-out shape of the transversely and longitudinally folded structure to be formed and movable continuously to advance the roughed-out shape in a downstream direction;

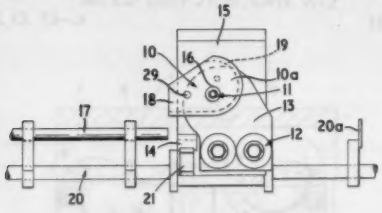
means for continuously feeding at least one strip of sheet material to said forming assemblies, said feeding means being positioned upstream from said forming assemblies; and

bunching means positioned downstream from said forming assemblies for transversely and longitudinally tightening up the folds of the roughed-out shape to form the final herringbone-pleated structure.

4,012,933
BENDING MACHINES

John Brian Porter, Newton Abbot, England, assignor to Russel Bowen Systems Ltd., Newton Abbot, England

Filed Sept. 4, 1975, Ser. No. 610,229
Claims priority, application United Kingdom, Sept. 11, 1974, 39612/74
Int. Cl.² B21D 7/024
U.S. Cl. 72—217 16 Claims

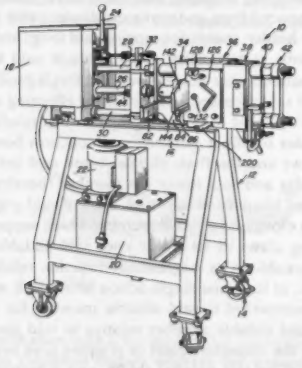


1. A bending unit comprising:
a. a former device;
b. bending means disposed on a rotatably mounted bending arm means;
c. a clamp member;
d. means for rotating the bending arm means about a fixed axis;
e. carrier shaft means disposed coaxially with said fixed axis; and
f. means connecting the former device to the carrier shaft to move the former device between an open position and a bending position;
g. in the open position said former device being spaced apart from the bending means by an amount sufficient to allow movement of a workpiece therebetween;
h. in the bending position said former device being effective to thrust a workpiece against the bending means and clamp member.

4,012,934
MULTIPURPOSE METAL WORKING MACHINE

Guthrie B. Stone, Honeoye, and William F. Holmes, Springwater, both of N.Y., assignors to Springwater Mfg. Co., Inc., Honeoye, N.Y.

Filed Sept. 14, 1973, Ser. No. 397,572
Int. Cl.² B21D 43/28; B21K 27/06; B26D 5/08
U.S. Cl. 72—324 15 Claims

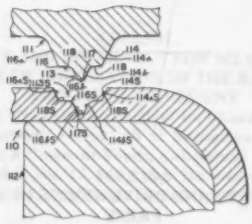


1. A work deforming machine comprising a frame, a plurality of separate slide members, elongated guide means mounted by the frame for establishing a path of movement along which said slide members are reciprocable, tool means response to relative movement of the slide members for performing different operations, power operated means connected to one of said slide members for imparting reciprocable movement thereto, and lock means for selectively interconnecting the slide members with each other or with the frame to perform said different operations in response to reciprocation of said one of the slide members by the power operated means, each of said different operations being performed at spaced locations along said path of movement, at least one of said tool means including cooperating tool members mounted on adjacent ones of the slide members, at least one of said tool means including cooperating tool members mounted for selective movement on one of the slide members, one of said tool members being actuated by another of the slide members adjacent thereto.

4,012,935
SCORE AND TOOL FOR FORMING THE SCORE

Albert J. Holk, Jr., Frankfort, and Jerry D. Hawkins, Country Club Hills, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Division of Ser. No. 370,903, June 18, 1973, Pat. No. 3,898,944. This application Apr. 11, 1975, Ser. No. 567,351
Int. Cl.² B21D 51/38
U.S. Cl. 72—325 10 Claims



1. A scoring punch for forming a score in a metal sheet, said scoring punch comprising a punch member having a base, a rib projecting from an intermediate portion of said base with said base having inoperative flat surfaces on opposite sides of said rib, said rib having a bottom wall, opposing side walls inclined directly from said base toward said bottom wall, and at least one of said side walls having a ledge intermediate the length thereof and spaced from said bottom wall and said base, said one side wall being in sloping relation to said base both above and below said ledge.

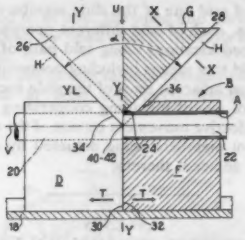
4,012,936
METHOD AND DEVICE FOR BENDING PIPES

Enrico Sebastiani, Milan, Italy, assignor to Tag Vertrieb A.G., Zurich, Switzerland

Filed Dec. 17, 1975, Ser. No. 641,580
Claims priority, application Italy, Dec. 20, 1974, 30863/74
Int. Cl.² B21D 7/06
U.S. Cl. 72—369 4 Claims

1. A method for forming a bend having a substantially zero inner radius of curvature in a pipe, said method comprising:
providing a straight length of pipe having a longitudinal axis and a predetermined cross-sectional configuration transverse to said axis, said length of pipe having a portion longitudinally thereof to be deformed into a bend;
applying a force, in a direction transverse to said axis, to a first section of said portion to be deformed, and physically shifting said first section in said direction;
applying a force in said direction to second sections of said portion to be deformed on immediate opposite longitudinal sides of said first section, and physically shifting said second sections in said direction while further shifting said first section; and

continuing to apply a force to successive additional sections of said portion to be deformed on opposite longitudinal sides of said first section, and successively physically shifting said additional sections in said direction while further shifting previously shifted sections;



all of said sections being shifted solely in said direction and parallel to each other;

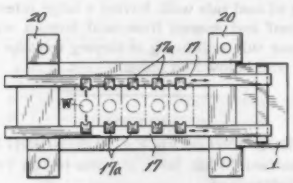
whereby there is formed in said portion to be deformed a bend having a substantially zero inner radius of curvature.

4,012,937

WORK TRANSFER AND DRIVE DEVICE IN A TRANSFER PRESS

Shozo Imanishi, Sagamihara, Japan, assignor to Aida Engineering Ltd., Kanagawa, Japan

Filed Mar. 23, 1976, Ser. No. 669,650
Claims priority, application Japan, Apr. 5, 1975, 50-40789
Int. Cl.² B21D *43/00*
U.S. Cl. 72—419 **3 Claims**



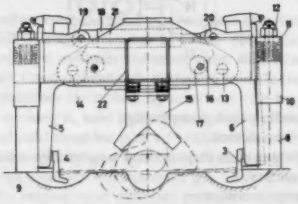
1. A work transfer and drive device in a transfer press comprising a stationary shaft supported in the framework of said press, an actuator gear rotatably supported on said stationary shaft to be driven by a prime mover through intermediary drive shaft of said press, a sun gear integrally mounted on said stationary shaft in coaxial relationship to said actuator gear, a planetary gear fixedly secured to an eccentric shaft on said actuator gear in meshing with said sun gear, an eccentric pin integral with said eccentric shaft, a rotary member rotatably mounted on said stationary shaft and having a radial groove formed therein for slidably receiving said eccentric pin, said rotary member having a second eccentric pin, a first slidable member guided by a stationary guide bar parallel to feed bars of said transfer press for operatively receiving said second eccentric pin and a second slidable member operatively connected to one of feed bars and to said first slidable member.

4,012,938

DEVICE FOR INSERTING OR REMOVING A HOT BLANK IN A DROP HAMMER

Karl Ivar Brändstrom, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed May 21, 1975, Ser. No. 579,634
Claims priority, application Sweden, June 7, 1974, 7407506
Int. Cl.² B21D *43/10, 45/06*
U.S. Cl. 72—422 **9 Claims**



1. A device adapted to coact with the flash on a hot blank for manipulating said blank relative to a forging tool in a drop hammer, said forging tool comprising a lower die member, said device comprising two pairs of gripping jaws carried by a unit connected to a rotatable tongs arm, said jaws being operative to coact with said blank via recesses provided in said forging tool, each of said recesses having a smoothly curved, cup-shaped interior configuration dimensioned to receive one of said gripping jaws during movement of said tongs arm, each of said recesses being located in said forging tool at a position spaced inwardly from the outer edges of said tool at a location below at least a portion of the flash formed on said blank when said blank is forged in said forging tool, a counter-holder positioned to engage said lower die member of said forging tool adjacent an edge of each of said recesses, said gripping jaws and said counter-holder being mounted on said unit for insertion over said blank by movement of said tongs arm, a gripping claw supported by each of said gripping jaws respectively for selectively engaging said flash, each of said gripping claws being spaced from and vertically displaceable relative to said counter-holder, means for moving said tongs arm to insert said claws into said cup-shaped recesses in said tool while positioning said counter-holder over said forging tool adjacent said edges of said recesses, and means for effecting a selective vertical displacement of said gripping claws in relation to said counter-holder to effect simultaneous coaction between said gripping claws and the flash on said blank and between said counter-holder and said lower die member thereby to break loose a forged blank from said tool, each of said gripping jaws including an elongated slidable member which supports one of said gripping claws at its lower end, said slidable member being displaceable in its longitudinal direction relative to said gripping jaw, at least one single-action lifting jack and at least one spring connected to said slidable member for selectively displacing said slidable member relative to said jaw, the gripping jaws in the respective pairs of gripping jaws being pivotably supported on two parallel shafts, and a hydraulic piston connected to the upper parts of said jaws for controlling movement of said jaws about said shafts to move said claws toward and away from one another.

4,012,939
LOCATION DETECTING DEVICES AND METHODS

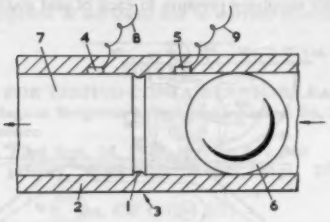
Alan Thomas Joseph Hayward, Glasgow, Scotland, assignor to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed June 10, 1975, Ser. No. 585,520

Claims priority, application United Kingdom, June 12, 1974, 26171/74

Int. Cl.² G01F 25/00; G01L 9/12

U.S. Cl. 73—3 **10 Claims**



1. A detection device for sensing the presence of a passing discrete body transported longitudinally through a closely fitting pipeline by fluid flow, comprising an inwardly extending annular region of constricted cross-section formed within the pipeline, said region having an internal peripheral surface which is of smaller transverse cross-section than, and momentarily engageable with, an external peripheral surface of the passing discrete body, thereby to impede momentarily said fluid flow, and to cause a continuous build-up of upstream fluid pressure until said upstream fluid pressure is of sufficient magnitude to force said discrete body through said region, at least one of said two peripheral surfaces being resilient; and detection means in the internal surface of said pipeline and adjacent said region, adapted for detecting a momentary variation in a local, mensurable parameter, said momentary variation being consequent upon the momentary engagement between said two peripheral surfaces.

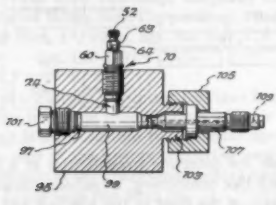
4,012,940
CONFORMAL PRESSURE TRANSDUCER

Nicholas D. Change, West Seneca, and Michael T. Riggs, Batavia, both of N.Y., assignors to PCB Piezotronics, Inc., Depew, N.Y.

Division of Ser. No. 521,687, Nov. 7, 1974, Pat. No. 3,960,018, which is a division of Ser. No. 381,700, July 23, 1973, Pat. No. 3,886,792, which is a continuation-in-part of Ser. No. 234,017, March 13, 1972, abandoned. This application Apr. 19, 1976, Ser. No. 678,216

Int. Cl.² G01L 9/06, 27/00

U.S. Cl. 73—4 R **1 Claim**



1. In combination with a transducer for converting pressure changes into electrical signals wherein the pressure changes act on one surface of a relatively thin wall comprising a housing, piston means on one end of said housing and having a contoured end surface conforming to the other surface of said wall opposite the surface on which said pressure changes act, piezoelectric means within said housing and mechanically connected to said piston means, and electrical path defining means for connecting said piezoelectric means to means for deriving an electrical signal, whereby when said contoured end surface of said piston means firmly contacts and conforms to the other surface of said wall, pressure applied through said wall to said contoured end surface deforms said piezoelectric means to generate an electrical output signal proportional to the applied pressure wherein said pressure changes occur within a tube which is closed at one end and opened at the other and wherein said contoured end surface of said piston means is concave so as to conform to the outer surface of the tube: calibration fixture means comprising a body having a chamber for holding said tube, means in said body for positioning said transducer so that said contoured end surface of said piston means firmly contacts and conforms to the outer surface of said tube, and means communicating with said chamber for introducing a known calibration pressure into said tube through the open end thereof.

4,012,941
METHOD OF AND APPARATUS FOR MEASURING THE AMPLITUDE OF OSCILLATION OF THE BALANCE OF A TIMEPIECE MOVEMENT

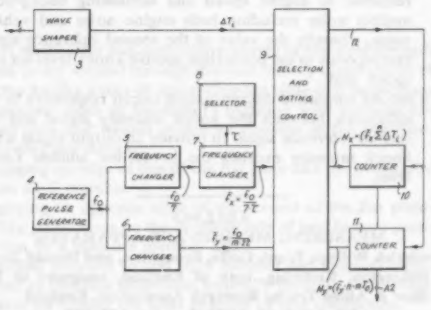
Erich Jucker; Yvan Greiner, both of La Chaux-de-Fonds, and André Lehmann, Peseux, all of Switzerland, assignors to Portescap, La Chaux-de-Fonds, Switzerland

Filed Jan. 13, 1976, Ser. No. 648,817

Claims priority, application Switzerland, Jan. 14, 1975, 407/75

Int. Cl.² G04D 7/12

U.S. Cl. 73—6 **18 Claims**

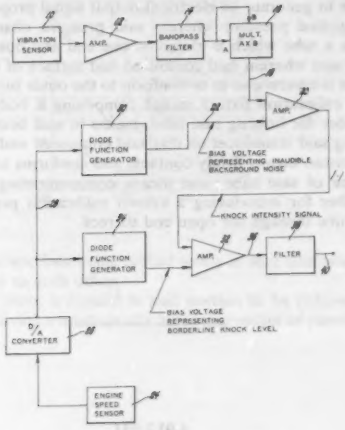


1. A method of measuring the amplitude of oscillation of the balance of a timepiece movement having an escapement adapted for disengagement and engagement, successively, the balance having a predetermined angle of lift, comprising the steps of measuring the time intervals between successive disengagement and engagement, measuring the duration of vibration of said balance; counting the number of pulses of a first frequency produced during at least one of said measured time intervals; counting the number of pulses of a second frequency produced during at least one of said vibration durations, said first and second frequencies exhibiting a predetermined relationship relative to each other; and dividing the number of said pulses of said second frequency by the number of pulses of said first frequency, whereby the quotient is equal to said amplitude.

4,012,942
BORDERLINE SPARK KNOCK DETECTOR

John L. Harned, Grosse Point Woods, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 17, 1976, Ser. No. 686,643
Int. Cl.[2] G01L 23/22
U.S. Cl. 73—35 3 Claims



2. A borderline knock detector for a spark ignition internal combustion engine comprising

means for sensing engine vibrations arising from engine knock and engine background noise and for providing a corresponding electrical vibration signal,

means effective to produce a first reference signal in response to engine speed simulating engine inaudible background noise,

a first amplitude discrimination circuit responsive to the difference between the electrical vibration signal and the first reference signal to provide a knock intensity signal,

means effective to produce a second reference signal in response to engine speed and simulating background audible noise including both engine noise and vehicle noise, whereby the value of the second reference signal corresponds to the borderline audible knock level for that speed, and

a second amplitude discrimination circuit responsive to the difference between the knock intensity signal and the second reference signal to provide an output signal when knock intensity exceeds the borderline audible knock level.

4,012,943
MEASURING METHOD AND APPARATUS

Frederick William Frank Goffe, Broughton, and Donald James Pilkington, Kettering, both of England, assignors to The Shoe & Allied Trades Research Association, England

Filed Oct. 10, 1975, Ser. No. 621,553
Claims priority, application United Kingdom, Oct. 10, 1974, 44032/74
Int. Cl.[2] G01B 13/20, 13/04
U.S. Cl. 73—37.7 13 Claims

1. Apparatus for measuring the area of irregularly shaped, flexible workpieces comprising:

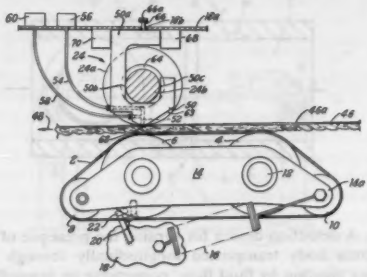
a plurality of nozzles arranged in a row, each said nozzle having an orifice for the passage of a fluid therethrough;

supporting means extending along said row of nozzles and in opposed relationship to said orifices, said supporting means being operative to support said workpiece in engagement with those of said nozzles which are aligned with said workpiece and to cause said workpiece to close the orifices of said aligned nozzles when in engagement with said workpiece;

mounting means mounting said nozzles for movement independently of each other towards and away from said supporting means, said nozzles being biased towards said supporting means, and said supporting means being constructed and arranged so as not to close the orifices of any of said nozzles not aligned and in engagement with said workpiece;

conveying means for conveying said workpiece while supported by said supporting means in engagement with said nozzles past said nozzles in a direction transverse to said row of nozzles and transverse to the direction of said movement of said nozzles;

means for supplying pressure to each of said nozzles;



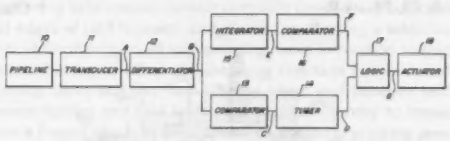
a plurality of pressure sensors connected, respectively, to each of said nozzles, each said pressure sensor being responsive to pressure within the nozzle to which it is connected, and operable to assume a first state while the orifice of each said connected nozzle is not closed by engagement with said workpiece and a second state while said orifice is closed by engagement with said workpiece; and

counting means operable to repeatedly count the number of said sensors in said second state while said workpiece is conveyed past said nozzles, whereby a measure of the area of said workpiece will be obtained upon completion of the conveying of said workpiece past said nozzles.

4,012,944
ELECTRONIC FLUID PIPELINE LEAK DETECTOR AND METHOD

Morris T. Covington, and Steven M. Griffin, both of Houston, Tex., assignors to Shafer Valve Company, Mansfield, Ohio

Filed Dec. 9, 1974, Ser. No. 530,709
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.[3] G01M 3/08
U.S. Cl. 73—40.5 R 10 Claims



1. A system for detecting irregularities in a fluid carrying pipeline or the like comprising; transducer means monitoring a characteristic of the fluid in the pipeline and providing an output signal proportional thereto; differentiator means receiving the output signal of said transducer means and providing an output signal proportional to the rate of change of said characteristic with respect to time; first comparator means receiving the output signal of said differentiator means, comparing that output signal with a preselected rate of change of said characteristic with respect to time and providing an out-

put signal when the output signal of said differentiator means exceeds said preselected rate of change; timing means receiving the output signal of said first comparator and providing an output signal after a predetermined time delay; integrator means receiving the output signal of said differentiator means and providing an output signal proportional to the total change of said characteristic; second comparator means receiving the output of said interator means, comparing that output signal with a preselected total change of said characteristic and providing an output signal when the output of said integrator means exceeds said preselected total change; said output signal of said timing means and said output signal of said second comparator being indicative of an irregularity in the fluid pipeline of sufficient size to warrant correction.

4,012,945

MEANS FOR TESTING CONTAINERS FOR LEAKAGE

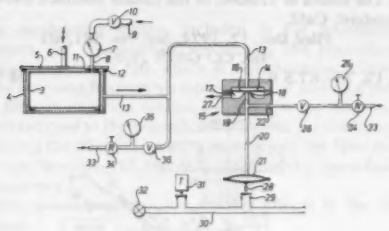
Gunnar Magnus Bergstrand, Stangholmsbacken 56, Skarholmen, Sweden

Filed Sept. 24, 1975, Ser. No. 616,310

Claims priority, application Sweden, Sept. 25, 1974, 7412067

Int. Cl.² G01M *3/32*

U.S. Cl. 73—49.2 **6 Claims**



6. Apparatus for detecting a change of fluid pressure in a closed space, said apparatus comprising:

fluid pressure sensitive means for responding within a predetermined period of time to a predetermined change in fluid pressure indicative of an unnacceptable rate of leakage;

conduit means for communicating said closed space with said fluid pressure sensitive means; and

fluid pressure modifying means for applying a controlled additional change in fluid pressure to said fluid pressure sensitive means and for thereby reducing the time necessary for response to said predetermined change in fluid pressure.

4,012,946

ULTRASONIC WELD INSPECTION SYSTEM

John A. Patsey, Penn Hills Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,770

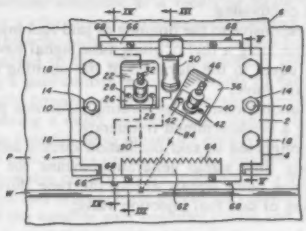
Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.7 **11 Claims**

1. A method of ultrasonic inspection for flaws in a longitudinal weld of a pipe or a weld joining plates wherein a beam of ultrasonic energy is directed into the material against a flaw which results in part of the energy scattering away from the flaw and in which part of the energy may reflect away from the flaw in a beam comprising the steps of

directing a beam of ultrasonic energy from a first transducer located on one side of the weld through a surface of the material joined by the weld into a predetermined region at the weld and

receiving, with a second transducer located on the same side of the weld as the first transducer, a portion of the ultrasonic energy scattered away from the flaw along a path which at the same time avoids receiving ultrasonic energy which may have reflected away from the flaw in a



beam and which extends from the predetermined region through the surface of the material.

4,012,947

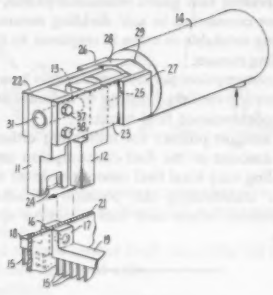
METHOD AND APPARATUS FOR TESTING BATTERY CONNECTOR WELDS

Ernest G. Tiegel, Bragato Road, Belmont, Calif. 94002

Filed Apr. 10, 1974, Ser. No. 459,568

Int. Cl.² G01N *3/24*

U.S. Cl. 73—101 **7 Claims**



1. A method for non-destructive testing of the weld strength of leak-proof welded through-the-wall battery connections of the type having a pair of upstanding flat plate-like projections on opposite sides of the battery partition with portions deformed into and welded within an opening in the partition, comprising the steps of

engaging an edge of one of the flat plate-like projections by an anvil member

engaging an opposite edge of the second of the flat plate-like projections on the opposite side of said battery partition by a pressure member and

applying pressure to said anvil member and pressure member in opposite directions generally parallel to the partition for testing the weld strength of said connection.

4,012,948

FUEL CONSUMPTION MEASURING DEVICE

Akira Kuno, Nagoya; Yoshio Shinoda, Okazaki, and Hiroshi Arai, Toyota, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed June 6, 1975, Ser. No. 584,497

Claims priority, application Japan, June 10, 1974, 49-65788

Int. Cl.² G01M *15/00*

U.S. Cl. 73—113 **4 Claims**

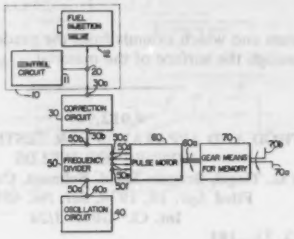
1. A fuel consumption measuring device for use in combination with a fuel injection system of the type in which the opening and closing of a fuel injection valve for intermittently

injecting fuel to an internal combustion engine is controlled in accordance with fuel injection time signals to thereby control the amount of fuel fed to said engine, said combustion measuring device comprising:

means responsive to the opening of said fuel injection valve for generating a fuel opening time signal having a pulse width equal to the duration of the opening of said fuel injection valve;

an oscillation circuit for generating reference pulse signals having a predetermined frequency;

means connected to said oscillation circuit and said valve opening time signal generating means for gating said reference pulse signals during the time duration of the opening of said fuel injection valve;



means for dividing said gated reference pulses,

a pulse motor connected to said dividing means, said pulse motor being rotatable in steps in response to the output of said dividing means;

a unit fuel consumption pointer operatively coupled to said pulse motor for cyclicly rotating to indicate consumption of said predetermined fuel quantity,

a total fuel amount pointer for indicating either the remanent fuel amount or the fuel consumption amount, and

means coupling said total fuel amount pointer to said pulse motor for maintaining the position of said total fuel amount pointer when said fuel injection system is not operative.

4,012,949

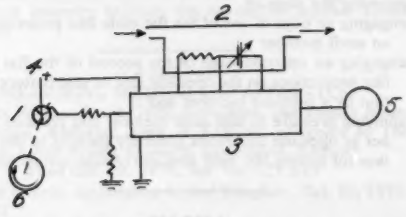
MILES PER GALLON COMPUTER SYSTEM MEANS

Walter J. Lanz, 82 Grant Ave., East Rockaway, N.Y. 11518

Filed Mar. 22, 1976, Ser. No. 669,149

Int. Cl.² G01F 9/00

U.S. Cl. 73—114 **3 Claims**



1. A new computer system means which provides accurate capability for both multiplication and division of two variable quantities and for presenting the result continually on a display indicator, comprising:

a first transducer means for converting one variable quantity into an output of a series of a series of electrical pulses varying in frequency;

a second transducer means for converting a second variable quantity into a varying output combination of electrical capacitance and resistance;

a computer means, technically termed a "monostable retriggerable multivibrator," which, being connected electrically to the outputs of the said first and second transducers, receives pulses from the first transducer and capacitance-resistance information from the second transducer, and provides an output series of pulses constant in amplitude, varying in frequency identically with the frequency of the pulses supplied by the first transducer, and varying in width in proportion to the variation of the capacitance-resistance information supplied by the second transducer, the resulting output voltage averaged with respect to time, being the arithmetical product of pulse amplitude, pulse frequency and pulse width;

a regulated d.c. voltage source connected to the said computer which provides energy for its operation and establishes the magnitude of the constant amplitude of the computer output pulses;

an indicator means electrically connected to the computer output, whose dynamic damping causes it to respond to the average voltage of the computer output.

4,012,950

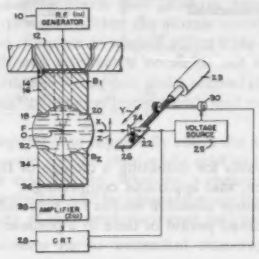
METHOD OF AND APPARATUS FOR ACOUSTIC IMAGING

Rudolf Kompfner, Stanford; Marvin Chodorow, Menlo Park, and Ross A. Lemons, Mountain View, all of Calif., assignors to The Board of Trustees of the Leland Stanford University, Stanford, Calif.

Filed Dec. 12, 1974, Ser. No. 531,902

Int. Cl.² G01N 29/04

U.S. Cl. 73—67.5 R **38 Claims**



1. The method of acoustic imaging an object which comprises the steps of generating an acoustic beam at a predetermined frequency, focusing the acoustic beam at a predetermined focal point located in proximity to the object to be imaged whereby the focused acoustic energy impinges on the object, detecting acoustic energy resultant from such impingement with the object at a different frequency, and converting the detected acoustic energy to an output electric signal.

4,012,951

ACOUSTIC EXAMINATION METHODS AND APPARATUS

Lawrence W. Kessler, 418 Warren Road, Glenview, Ill. 60025

Filed Mar. 8, 1976, Ser. No. 664,650

Int. Cl.² G01N 29/04

U.S. Cl. 73—67.6 **29 Claims**

1. In an acoustic imaging system for developing a visual image representative of the acoustic properties of an object, of the kind comprising:

an elastically deformable and at least partially light-reflective surface coupled to the object;

insonification means for insonifying the object with acoustic waves of predetermined frequency f_s to develop a ripple pattern at the interface surface which is characteristic of the acoustic properties of the object;

scanning means for scanning a high-energy small-diameter light beam across the interface surface;

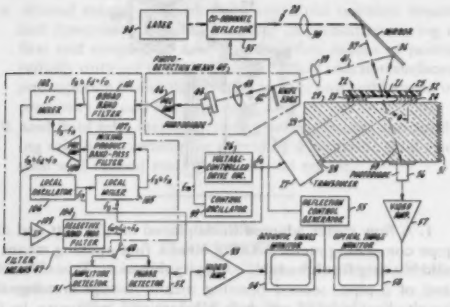
photodetection means for detecting the portion of the light

beam reflected from the interface surface to develop an initial electrical signal;

filter means for filtering the initial electrical signal to eliminate sidebands having undesired phase reversals and develop an image signal;

and imaging means utilizing the image signal to develop a visual image representative of the acoustic properties of the object;

the improvement comprising:



sonic modulating means, included in the insonification means, for continuously modulating the insonification frequency f_s at a rate which is asynchronous relative to any scanning frequency employed in the scanning means;

and filter modulation means, included in the filter means and coupled to the insonification means, for continuously varying the effective center frequency of the filter means in synchronism with the modulation of the insonification frequency f_s;

thereby minimizing acoustic speckle effects in the visual image.

4,012,952

ULTRASONIC SYSTEM

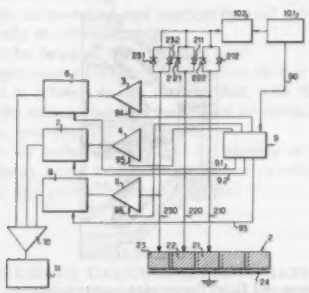
Jacques Dory, Meaux, France, assignor to Realization Ultrasoniques, France

Filed Nov. 21, 1974, Ser. No. 525,751

Claims priority, application France, Nov. 22, 1973, 73.41921

Int. Cl.² G01N *29/00*

U.S. Cl. 73—67.7 **5 Claims**



1. An ultrasonic pulse echo probing apparatus comprising a high frequency generator for exciting recurrent probing electric pulses, a flat probe including a plurality of piezoelectric transducer elements symmetrical-by mounted with respect to a common axis and integral with a common flat support, said transducer elements being electrically and piezoelectrically insulated from each other and simultaneously energized in parallel by said high-frequency generator, the probe propagating an ultrasonic beam substantially at right angles to said flat support and which transverses a test area and is reflected back to the transducer elements as a receiving beam to provide echo pulses; a plurality of variable-gain amplifier means for amplifying the echo pulses, said amplifier means being respectively connected to the respective transducer elements and each having a gain control input; a plurality of variable delay means serially connected to the respective amplifier means and each having a delay control input; display means, connected to the variable delay means for displaying the amplified and delayed echo pulses provided by the transducer elements and programmable control means, connected to the said gain control inputs and delay control inputs, for varying the respective gains of the variable gain amplifier means and the respective time delays of the variable delay means as a function of the time elapsed from the transmission of each transmitted electric pulse, thereby focalizing the receiving beam at a variable depth within the tested area in synchronism with the propagation of the transmitted pulses within the tested area.

4,012,953

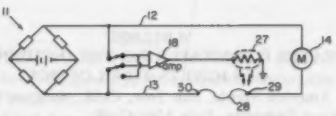
SHORT TERM CREEP COMPENSATION FOR LOAD CELLS

Alfred Newman Ormond, 11969 E. Rivera Road, Santa Fe Springs, Calif. 90670

Filed Mar. 18, 1976, Ser. No. 667,991

Int. Cl.² G01L *1/04, 1/22*

U.S. Cl. 73—141 A **5 Claims**



1. A system for compensating creep characteristics of a load cell resulting in drift in the load cell output signal, including, in combination:

a. first and second output leads receiving the original output signal from said load cell;

b. an amplifier;

c. first and second input leads for said amplifier connected to tap points on said first and second output leads respectively to provide an amplified output signal at the output of said amplifier; and,

d. a signal conditioning means connected to the output of said amplifier, said signal conditioning means being responsive to said amplified output signal to introduce into said second output lead a compensating signal equal and opposite to the drift of said original output signal.

4,012,954

TESTING APPARATUS FOR LIGHT- AND WEATHER-RESISTING PROPERTIES

Hans Ulrich Klippert, Hanau am Main, Germany, assignor to Original Hanau Quarzlampen GmbH, Hanau am Main, Germany

Filed Jan. 20, 1976, Ser. No. 650,644

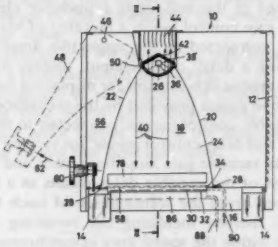
Claims priority, application Germany, Jan. 21, 1975, 2502239

Int. Cl.² G01N *17/00*

U.S. Cl. 73—150 R **25 Claims**

1. Testing apparatus for light- and weather-resisting properties, comprising a sample room and a gas discharge radiator arranged in the sample room, as well as a mirror arranged between the radiator and the samples, selectively reflecting the infrared portion of the radiation and permeable to the visible and ultraviolet portions thereof, and an additional mirror, selectively reflecting the visible and ultraviolet portions of the radiation and permeable to the infrared portion, characterized by the facts that the samples (**30**), in a manner

already known as such, are placed on an essentially horizontal support (**32, 86, 92**) and that the sample room located above the support is composed by an oblong reflector channel (**18**) of parabolic section, of which the extremities are shut off by



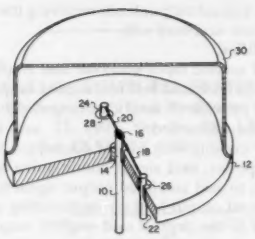
front walls (**24**) of parabolic contour; and the side walls (**20, 22**) of the reflector channel (**18**), being parabolic in operational condition, are made of elastic ductile sheet-metal, which assumes the parabolic shape when applied to the parabolic contour of the front walls (**24**).

4,012,955

APPARATUS FOR MEASURING THE INCIDENT POWER OF LIGHT IN FIBER OPTICS

Pedro Americo Szente, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 19, 1976, Ser. No. 650,404
Int. Cl.² G01K *17/00*
U.S. Cl. 73—190 EW **9 Claims**



1. An apparatus for measuring the incident power of light from a fiber optic light conductor comprising:

a first fiber optic light conductor for receiving light;

a measurement thermistor which has first and second electrical leads and which is bonded to an end of the first fiber optic light conductor with an optically transparent bonding agent;

a second fiber optic light conductor which receives no light;

a reference thermistor which has first and second electrical leads and which is bonded to an end of the second fiber optic light conductor; and

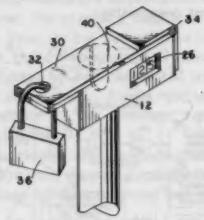
electrical connection means for providing electrical connection to the measurement and reference thermistors and adapted to be connected to metering apparatus to provide an indication of the incident power of the light transmitted through the first fiber optic light conductor to the measurement thermistor, the electrical connection means including electrically conductive terminals to which the first and second leads of the measurement and reference thermistors are attached.

4,012,956

FLOW METER

Eugene Carignan, Pawtucket, R.I., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Apr. 28, 1976, Ser. No. 681,071
Int. Cl.² G01F *15/18*
U.S. Cl. 73—201 **3 Claims**



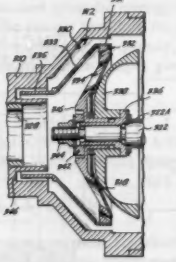
1. A flow meter adapted to be placed on the butt end of a pipe comprising meter housing means, first opening means in said housing for threadably engaging thread means on the butt end of a pipe, second opening means in said housing, the longitudinal axis of which is substantially transverse to the longitudinal axis of said first opening, a door means operably secured to the top of said housing and extending over said first opening, lock means for locking said door over said first opening and to said housing, flow meter means removably insertable in said housing through said door and into said first opening whereby said housing is threadly securable to the butt end of a threaded pipe, the end of said pipe having a U-shaped cutout for receiving said meter and when the meter is placed in said housing and in said pipe, fluid flow in said pipe may be measured, and said hinged door may be locked to prevent removal of said meter from the pipe and to seal the butt end of the pipe.

4,012,957

SHROUDED FLOWMETER TURBINE AND IMPROVED FLUID FLOWMETER USING THE SAME

William E. Chiles, Woodinville; LeRoy E. Vetsch, Lynnwood, and Jack V. Peterson, Seattle, all of Wash., assignors to Eldec Corporation, Lynnwood, Wash.

Filed Apr. 27, 1976, Ser. No. 680,856
Int. Cl.² G01F *1/10*
U.S. Cl. 73—231 R **11 Claims**



1. An improved fluid flowmeter comprising:

a. housing means defining therein a fluid measurement chamber and further including fluid inlet means and fluid outlet means situated, respectively, at opposite ends of said fluid measurement chamber for admitting fluid into and removing fluid from said fluid measurement chamber, said fluid inlet means thereby defining an inlet opening having a predetermined cross-sectional area;

b. a fluid reaction means mounted within said fluid measurement chamber for rotation about an axis of revolu-

tion substantially aligned with said inlet opening and spaced apart from said inlet opening in the direction of fluid flow through said fluid measurement chamber, said fluid reaction means having a cross-sectional area in a direction transverse to the direction of fluid flow which is greater than said predetermined cross-sectional area of said inlet opening, said fluid reaction means further including a plurality of fluid reaction surfaces located radially outward of said axis of revolution for imparting rotational movement to said fluid reaction means;

c. shroud means rotatable with said fluid reaction means and comprising a hollow member of revolution having a first end coupled to said fluid reaction means at points radially outward of said plurality of fluid reaction surfaces and tapering from said first end to a second end located in proximity to said inlet opening, and

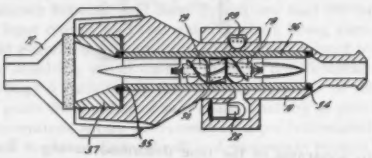
d. said fluid inlet means including sealing means surrounding said inlet opening for providing a rotatable fluid seal with said second end of said shroud means.

4,012,958

FLOWMETER

Lionel Ivor Taylor, Copythorne House, Copythorne, Southampton, England

Filed Dec. 9, 1975, Ser. No. 639,115
Int. Cl.² G01F 1/10
U.S. Cl. 73—231 R **3 Claims**



1. A fluid flowmeter, particularly for use with a specified fuel for measuring the rate of flow thereof to an engine, said flowmeter including a tube with an inlet and outlet for connection with the fuel pipe-line, a rotor mounted for rotation within the tube by bearing assemblies, the rotor including helical vanes extending along its length and substantially filling the cross-section of the bore of the tube, a light source and a photo-responsive device disposed on opposed sides of the tube whereby a light beam is cyclically interrupted by the vanes of the rotor to produce an output signal having a component of frequency proportional to the rate of rotation of the rotor, characterized by:

a. a body surrounding and supporting said tube over substantially its whole length,

b. said tube being of a transparent glass,

c. the light-source and photo-responsive device being positioned in relation to the tube so that, with the specified fuel, the tube acts in the manner of an optical bi-convex lens to converge the light beam,

d. said body including apertures for passage of the light,

e. said body being integral with means carrying the light source and photo-responsive means.

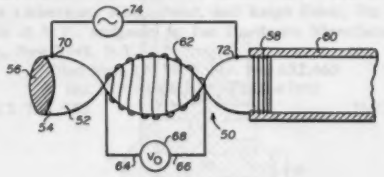
4,012,959

PRESSURE GAUGE AND FLOW METER

Ivan J. Garshelis, 61 Oleander Way, Clark, N.J. 07066

Division of Ser. No. 488,209, July 12, 1974, Pat. No. 3,961,297. This application Oct. 22, 1975, Ser. No. 624,524
Int. Cl.² G01L 9/10; G01F 1/58
U.S. Cl. 73—398 R **2 Claims**

1. A pressure gauge comprising a current conductive rod which exhibits magnetic anisotropy in other than a purely circular or longitudinal direction, a conductive coil wound about said rod, and means for applying an alternating current through said rod of sufficient magnitude to produce a helical magnetization of said rod in a given direction during one half cycle of said current and for reversing the direction of said helical magnetization during the next half cycle of said current, whereby to produce a change in the linkage of axial flux in said rod with said conductive coil to cause an AC output signal at the terminal thereof, wherein the rod is magnetostrictive and the anisotropy results from the rod being twisted, and



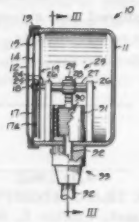
said rod is a hollow tube that is rotationally asymmetrical and twisted about its longitudinal axis, and further comprising means for closing one end of said tube and means for connecting the other of said tube to a pressure line, whereby as pressure in said line increases, said tube will be untwisted to increase helical anisotropy and the magnitude of said AC output signal.

4,012,960

PRESSURE GAUGE WITH EXPANSIBLE BELLOWS

Gail G. Barbee, Montgomery, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 25, 1975, Ser. No. 607,523
Int. Cl.² G01L 7/06
U.S. Cl. 73—410 **11 Claims**



1. A gauge comprising

a case,

pressure inlet means secured on said case for communicating a variable pressure level thereto,

expansible and contractible bellows means communicating internally with said pressure inlet means for expanding or contracting in response to said variable pressure level,

indicating means movably mounted on said case comprising a color wheel rotatably mounted on said case and having color indicia thereon,

means connecting said bellows means to said indicating means for moving said indicating means in response to expansion and contraction of said bellows means upon variance of said pressure level, including a pinion rotatably mounted on said case and having said color wheel connected thereto for rotation therewith and a reciprocal rack meshing with said pinion and secured to said bellows means, and

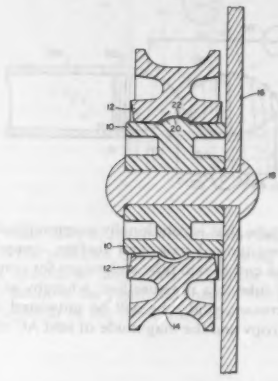
guide means for guiding reciprocal movements of said rack, including a roller rotatably mounted on said case and engaging said rack.

4,012,961

PULLEY AND SUPPORT COMBINATION

John Kent Cameron, Warwick, R.I., assignor to Kenney Manufacturing Company, Warwick, R.I.

Filed Jan. 15, 1976, Ser. No. 649,370
Int. Cl.² F16H 55/48, 55/36; B21D 53/26; R21K 1/28
U.S. Cl. 74—230.7 6 Claims



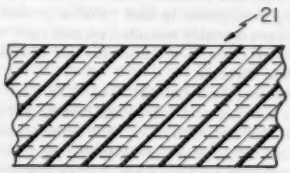
1. A self centering pulley comprising a generally cylindrical female outer race member of molded semi-elastic, semi-rigid plastic material having a waxy, low friction surface; a generally cylindrical male inner race member molded of like plastic material, said plastic material being sufficiently resilient with respect to the structural dimensions of said inner and outer race members to permit said inner race member to be forced into said outer race member by a snap fit, said inner race member extending axially beyond said outer race member in each direction, said inner race member being inversely tapered and contacting said outer race member only at substantial points of contact across its axial length toward the outer edges of said outer race member when the inner and outer race member are centered; and means for limiting axial relative motion between said members.

4,012,962

ENDLESS POWER TRANSMISSION BELT STRUCTURE

David G. Ballou, Ozark; Clinton L. Bishop, Springfield, and Toby K. Pope, Willard, all of Mo., assignors to Dayco Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 490,828, July 22, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,235
Int. Cl.² F16G 5/16; B29H 7/22
U.S. Cl. 74—233 11 Claims



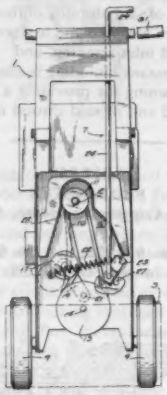
1. An endless power transmission belt structure comprising a thermoplastic polyester elastomer having an oriented crystalline structure about substantially its entire endless path, said crystalline structure being oriented only along said endless path.

4,012,963

CLUTCH MECHANISM FOR ROTARY TILLERS AND THE LIKE

Edward W. Enters, Fredonia, and Mark J. Itle, Sheboygan, both of Wis., assignors to Gilson Bros. Co., Plymouth, Wis.

Filed Feb. 23, 1976, Ser. No. 660,129
Int. Cl.² F16H 7/10
U.S. Cl. 74—242.15 R 7 Claims



1. In apparatus of the type described having a frame, an engine, an assembly to be rotated by said engine, and clutch means for selectively transmitting motion from said engine to said assembly, and characterized in that said clutch means comprises,

a drive sheave connected to and driven by said engine,

a driven sheave spaced from said drive sheave and connected to said assembly,

flexible belt means extending between and normally loosely engaging said drive and driven sheaves in a manner such that said belt means does not transmit motion between said drive and driven sheaves,

an idler sheave,

first bracket means pivotally mounted in a housing portion of said rotating assembly and connected to and supporting said idler sheave for pivotal movement toward and away from said belt at a point intermediate said drive and driven sheaves,

second bracket means spaced from said first bracket means and pivotally mounted relative to said drive and driven sheaves,

means connecting said first and second bracket means for transmitting pivotal movement therebetween,

control means connected to said second bracket means and operative to pivot said second bracket means,

said idler sheave biased toward a normal position wherein said idler sheave is out of operative tensioning engagement with said belt and said belt will be slack relative to said drive and driven sheaves,

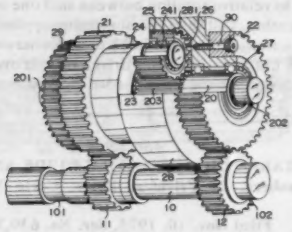
and said control means operative to selectively pivot said second bracket means in a direction which is transmitted through said connecting means to said first bracket means and pivots said idler sheave toward said belt to tighten said belt on said drive and driven sheaves to transmit rotary motion therebetween.

4,012,964

INTERMITTENT ROTARY MECHANISM

Yuan Ho Lee, 85, Jen Ho Road, Tainan, China /Taiwan

Filed Feb. 14, 1975, Ser. No. 550,002
Int. Cl.² F16H 55/04
U.S. Cl. 74—435 11 Claims



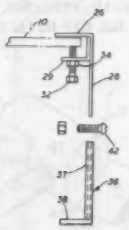
1. A high-speed intermittent rotary mechanism comprising:
a driving shaft,
a driven shaft,
means coacting with said driving shaft and said driven shaft for intermittently rotating said driven shaft in an intermittent rotary manner having a predetermined pitch and an intermittent dwell-and-movement motion, said rotating means including a revolving wheel train connected by two pairs of gears, each pair having an equal center-to-center distance between said driving shaft and said driven shaft, at least one of said two pairs of gears being cam gears, said gears being structurally adapted and related to cause the revolving wheel train to produce a differential speed through a variation in the meshing distances of said pair of gears from either of said shafts, thereby to provide an intermittent rotary movement of a predetermined pitch from the intermittent dwell-and-movement motion of the driven shaft.

4,012,965

GOVERNOR OR SIMILAR AUTO SPEED CONTROL

Adam E. Stupak, 3117 Detroit Ave., Cleveland, Ohio 44113

Filed May 7, 1975, Ser. No. 575,186
Int. Cl.² G05G 1/14
U.S. Cl. 74—513 3 Claims



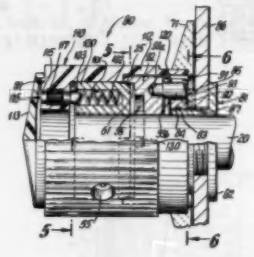
1. A governor or similar speed control device for a vehicle having a gas feed control foot pedal and comprising
a frame means for engagement with a food pedal,
a clamp means to secure said frame means to a foot pedal,
an adjustable length control member depending from said frame means a variable distance to limit depression of the foot pedal,
said frame means has a dependent leg having a longitudinally directed slot therein, said control member has a longitudinally directed slot therein, a lock means extends through said slots which are aligned when said control member and said leg are superimposed to secure them together but to enable adjustment of their relative axial positions, and
means on said dependent leg and control member align them longitudinally and retain them in slidable adjustable length engagement.

4,012,966

KNOB AND CONTROL SHAFT ASSEMBLY WITH BRAKE

Lester Lieberman, Kings Point, and Ralph Oddo, Dix Hills, both of N.Y., assignors to Jan Hardware Manufacturing, Inc., New York, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,465
Int. Cl.² A61B 5/12; F16D 67/02
U.S. Cl. 74—553 36 Claims



1. A knob control shaft assembly comprising a control shaft, a ring insert surrounding said shaft, means to fix said ring insert to said shaft, a knob body surrounding said ring insert and slidably mounted thereon, means to connect said knob body to said ring insert for rotatation together therewith, and spring means for sliding said body longitudinal forwardly relative to said ring insert, and ball means interposed between said spring means and knob body, said knob body having means partially receiving the ball means, to allow said knob to rotate relative to said ring insert when a turning torque imposed on said body is sufficient to cause said ball means to compress the spring means, to allow turning of the knob body without turning the ring insert, releasable means to lock the shaft against rotation, and means controlled by sliding movement of the knob relative to the shaft for controlling said lock means.

4,012,967

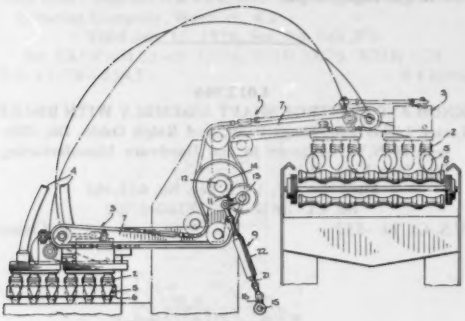
ADJUSTABLE DRIVE ROD SYSTEM

William H. Warren, 729 S. Main St., Centerville, Mass. 02632

Filed Aug. 22, 1974, Ser. No. 499,535
Int. Cl.² G05J 1/00
U.S. Cl. 74—586 1 Claim

1. In an egg transfer machine for transferring eggs from egg trays to a conveyor:
means for supporting one or more egg trays on an egg transfer table;
an egg transfer head movably mounted on said machine and including means for simultaneously engaging eggs in the uppermost tray;
a driving means;
a drive rod operatively coupling said driving means and said transfer head; and
adjusting means on said drive rod for limiting the maximum force exerted by said transfer head while said drive rod is moving said head toward said trays and being inoperative while said drive rod is moving said head toward said conveyor comprising means for movably connecting two spaced portions of said rod including a resilient member

urging said portions apart and thread means for adjusting the spring force without changing the rod length; and



second thread means for adjusting the rod length without changing the spring force.

4,012,968

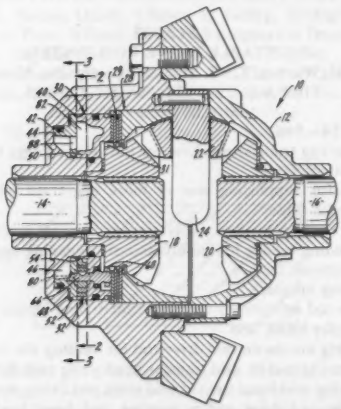
SPEED-SENSITIVE DIFFERENTIAL MECHANISM

Donald W. Kelbel, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 23, 1974, Ser. No. 535,596

Int. Cl.² F16H *1/44*; **F16D** *25/00*

U.S. Cl. 74—711 **8 Claims**



1. A limited slip differential comprising a casing adapted to be rotatably driven, gearing rotatably supported in said casing and adapted for connection with a pair of relatively rotatable output members, friction clutch means associated with said gearing and said casing and actuable to frictionally resist relative rotation between one of said output members and said casing, an actuator in operative association with said clutch means and mounted in said casing, fluid energy generating means within said actuator adapted to create fluid pressure in response to relative rotation between said one output member and said casing, said fluid pressure being applied to said actuator to actuate said friction clutch means wherein said generating means has an input means driven by said one output member and said input means is carried by said actuator.

4,012,969

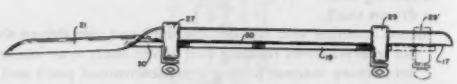
ADJUSTABLE CHAINSAW FILE GUIDE AND HOLDER

Elof Granberg, 21 Privateer Drive, Corte Madera, Calif. 94925

Filed Nov. 10, 1975, Ser. No. 630,734

Int. Cl.² B23D *63/12*

U.S. Cl. 76—36 **5 Claims**



1. An adjustable chainsaw file guide and holder comprising

an elongated frame having two generally flat guide surfaces angled to intersect in a V-shape, and

at least two adjustable clamping members each having a unitary sliding element with a shaped opening formed to at least partially closely surround the guide surfaces of said elongated frame for slidably engaging same at any point therealong,

said clamping member also including means for securing different diameter chainsaw files at any point along the length thereof and positively centering same relative to the vertex of said intersecting guide surfaces.

4,012,970

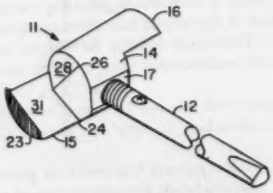
METHOD OF FORMING A WOOD BORING TOOL

Doran M. Hintz, Rte. 1, Box 230-L, and Lief H. Steinberger, Rte. 1, Box 231-A, both of Oroville, Calif. 95965

Filed Apr. 19, 1976, Ser. No. 678,165

Int. Cl.² B21K *5/02*

U.S. Cl. 76—102 **3 Claims**

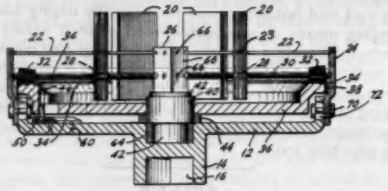


1. The method of forming a wood boring tool comprising the steps of providing a short blank of cylindrical tool steel bar stock, drilling an opening along a diameter of the cylindrical bar stock at its approximate mid-length, turning the opposite ends of the blank to a desired radius about the axis of the opening, machining away the opposite ends of the blank to form two oppositely directed radially extending arms having smooth lifting surfaces lying on chords of the cylinder which are oppositely directed and extend at approximately 30° from the axis of the opening, and facing the lower edges of the surfaces to provide oppositely directed cutting edges tangential to the opening.

4,012,971
ADJUSTABLE WRENCH MECHANISM

Craig H. Zeyher, 660 Clinton Ave., Haddonfield, N.J. 08033

Filed June 30, 1975, Ser. No. 591,439
Int. Cl.² B25B 13/16
U.S. Cl. 81—170 4 Claims

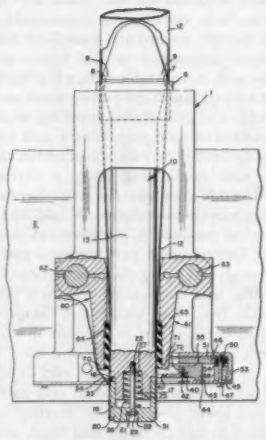


1. Wrench mechanism comprising: a casing; bracket means adjustably secured to the casing; gear means mounted for rotational movement within said casing; a series of threaded bars disposed in radial array within said casing each of which is journaled at one of its ends in said adjustable bracket means and at its opposite end in support structure carried by said casing; a gear drive secured to one end of each of said bars for rotation therewith and held in driving engagement with said gear means by said bracket means; a plurality of work-engaging elements formed cooperatively to serve as either an internal or external wrench and each of which is threadably engaged by individual ones of said threaded bars; and restraining means contacting each of said work-engaging elements to prevent rotational movement thereof whereby rotation of said gear means causes translational movement of said work-engaging elements along the radial paths defined by said threaded bars.

4,012,972
BAND APPLYING APPARATUS

Harold B. Rice, Walnut Creek, Calif., assignor to John Burton Machine Corporation, Rodeo, Calif.

Filed May 30, 1975, Ser. No. 582,379
Int. Cl.² B23B 3/04, 5/14; B65B 7/28
U.S. Cl. 82—70.2 11 Claims



1. In a device for cutting bands from one end of an elongated length of tubular material,

a housing,

an elongated cylindrical mandrel supported in said housing and adapted to be received within said material,

a casing carried by said housing,

a rotor supported for orbital movement within said casing and provided with a circular radially inwardly directed cutting edge in surrounding relationship to said mandrel for cutting said material,

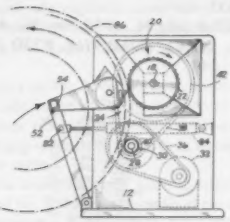
said casing being provided with an end wall in a plane at right angles to the axis of said mandrel and extending across the upper side of said rotor,

said end wall being free for movement by gravity into engagement with the upper side of said rotor to prevent shifting of the latter.

4,012,973
TIRE CUTTING APPARATUS

Myron D. Tupper, Sandy, Oreg., assignor to Tiregon, Inc., Portland, Oreg.

Filed Sept. 22, 1975, Ser. No. 615,550
Int. Cl.² B23B 3/04, 5/14; B29H 21/08
U.S. Cl. 82—82 8 Claims



1. Apparatus for cutting tire casings comprising

a frame and crown support means on said frame for supporting one side of the crown in a tire casing in a cutting station in the apparatus, said crown support means accommodating movement of the crown through said cutting station while supported by said support means,

guide means opposite said crown support means adapted to hold said crown against said support means while the crown moves through said cutting station,

a cutter knife assembly adjacent said guide means, including a knife mounted for movement of an end thereof beyond said guide means and into the crown, and biasing means urging said movement of the cutter knife beyond said guide means,

a movable mounting having said guide means and said cutter knife assembly jointly mounted thereon which is adapted to shift the guide means and knife assembly away from said crown support means, said mounting also mounting a deflector adapted for insertion between the side walls of a tire casing with such insertion producing deflection of the side walls away from each other as a preliminary to placing the inside of the crown against said guide means.

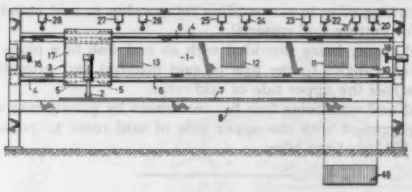
4,012,974
APPARATUS FOR CUTTING GLASS

Heinz-Josef Reinmold, Herzogenrath, Germany, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed July 25, 1975, Ser. No. 598,989
Claims priority, application France, Aug. 6, 1974, 74.27224
Int. Cl.² B26D 3/08
U.S. Cl. 83—6 8 Claims

1. Apparatus for producing cutting lines on strips or sheets of glass comprising a carriage, a cutting tool attached to said carriage for movement therewith, guide means for guiding said carriage along a predetermined path of travel, and linear motor means for producing movement of said carriage along said path of travel comprising an armature mounted on said carriage and a plurality of short inductor windings discontinu-

ously spaced along the path of travel of said carriage, the spacing between two or more successive inductor windings



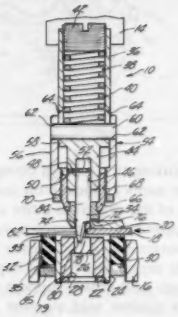
being greater than the length of the respective windings along the path of travel.

4,012,975

HIGH SPEED PUNCHING APPARATUS AND TOOL THEREFOR

Barry Grant LaLone, 268 W. Clarkston Road, Lake Orion, Mich. 48035

Filed July 31, 1975, Ser. No. 600,636
Int. Cl.² B26D 7/18; B23D 27/00
U.S. Cl. 83—140 **25 Claims**



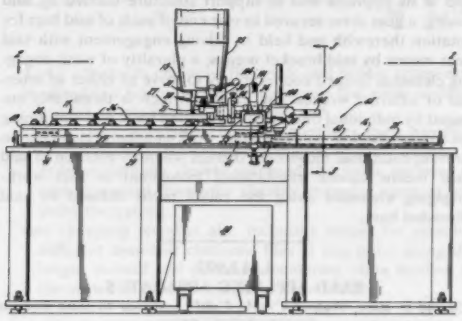
1. In high speed punching apparatus for rapidly, progressively cutting small portions of material from a workpiece along a preselected line and including a support table, a die button supported on the support table, the die button having a die opening and reciprocating apparatus for providing high speed reciprocating motion relative to the support table, the improvement comprising a punching tool assembly adapted to be reciprocated by the reciprocating apparatus, said punching tool assembly including an elongated punching tool adapted to be received within the die opening for reciprocal motion therein, said punching tool providing a shearing action of the workpiece on a downward, cutting stroke and being retracted from the workpiece on an upward, retracting stroke, said punching tool having an elongated shank of a straight cylindrical shape, a cutting surface formed proximate one end, said cutting surface extending for only a portion of the cross section of said shank and being defined by a notch in said shank, said cutting surface having a radially extending surface, said notch having axially extending surface defining an oblique angle with said radially extending surface and connected therewith by a connecting radius whereby said cutting surface, and said axially extending surface of said notch with said connecting radius inhibit hangup of chips on said cutting surface, said shank of said punching tool being generally of the same diameter as the die opening, said punching tool having a tip portion extending generally from a position intermediate said cutting surface and the end of said punching tool, said tip portion having an outer, frusto conical shape of a sufficient length such that said tip portion when located in said die opening can define a clearance relation with the confronting surface of the die opening whereby rubbing, frictional engagement of said shank of said punching tool and the die opening is minimized, tool holding means for removably holding said punching tool and adapted to be held by the reciprocating apparatus, and tool stripping means operatively connected with said tool holding means for stripping the workpiece from said tool on said retracting stroke, said stripping means including stock engaging means for engaging the workpiece during said cutting stroke, and spring means operatively connected with said tool holding means for normally urging said stock engaging means at a predetermined preload axially in the downward direction whereby said stock engaging means strips the workpiece away from said punching tool on said retracting stroke, and load adjustment means selectively adjustable for varying said predetermined preload to vary the stripping force to accommodate differences in materials and the condition of said punching tool.

4,012,976

PUNCH PRESS FOR DUPLICATING WORKPIECES

Theodore F. Brolund, Rockford, Ill., assignor to W. A. Whitney Corporation, Rockford, Ill.

Filed Apr. 23, 1975, Ser. No. 570,762
Int. Cl.² B26F 1/02
U.S. Cl. 83—146 **9 Claims**



1. A punch press for producing duplicate piece parts one at a time from a plurality of workpiece blanks, said press including an upright frame, an acutator mounted on said frame, a fixed tool element mounted on said frame and spaced from said actuator, a movable tool element connected to said actuator and movable thereby toward and away from said fixed tool element, a stripper connected to said frame adjacent said movable tool element, a worktable with a top having a punching area located around said fixed tool element and a duplicating area disposed to one side of said punching area, a movable bed slidably mounted on said table above said top for movement across said tip in only an *x* direction within said punching area and over said duplicating area, a carriage slidably mounted on said bed for bodily movement therewith in said *x* direction and for movement relative to said bed only in a *y* direction thereby to produce *x*, *y* movement relative to said table top, a first formed piece part having a pattern of holes formed therethrough and being clamped removably to the top of said table within said duplicating area in a predetermined position from said fixed tool element, a reciprocable stylus connected to said carriage for movement toward and away from engagement with said piece part and for *x* and *y* movement with said carriage and bed across said duplicating area, a workpiece blank, a clamp secured to said carriage and including upper and lower jaws movable relative to each other to fasten said blank to said carriage, said blank extending from said carriage, into said punching area and being positioned with respect to said stylus so that, as said carriage is moved to position said stylus over the different holes in said piece part, said blank is located in corresponding positions relative to said fixed and movable tool elements, a lower tip mounted on said stylus and shaped to center within each of the holes in said

piece part for a predetermined range of hole sized so as to locate and lock said carriage, bed and blank accurately in said corresponding positions for punching a hole pattern in said blank substantially identical to the hole pattern in said piece part, and means mounting said jaws on said carriage for vertical movement with said blank as the latter is stripped from said movable tool element by said stripper, said means comprising a support mountable on said carriage, a cap connected to said support and extending outwardly therefrom in a generaly horizontal direction above said jaws, a first pair of spaced guide rods connected between said cap and said lower jaw with said guide rods extending vertically and slidably through said support so said cap and said lower jaw are mounted for vertical movement together with respect to said support, a second and similar pair of spaced guide rods connected vertically between said cap and said lower jaw and spaced from said support, said upper jaw being slidably mounted on said second pair of guide rods between said cap and said lower jaw, and means for moving said upper jaw on second pair of guide rods toward and away from said lower jaw to clamp and release said workpiece blank.

4,012,977

APPARATUS FOR CONTROLLING MOVEMENT OF STAMPING DEVICE

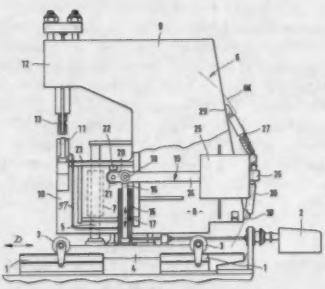
Ludwig Regenbrecht, Gevelsberg, Germany, assignor to Rolf Peddinghaus, Gevelsburg, Germany

Filed Mar. 12, 1976, Ser. No. 666,210

Claims priority, application Germany, Mar. 13, 1975, 2511012

Int. Cl.² B26D *5/12*

U.S. Cl. 83—368 **4 Claims**



1. A stamping device comprising a vertically guided frame assembly including a matrix and an aligned opposed punching die positioned to punch holes in a member disposed therebetween, means supporting said frame assembly in a balanced position to permit ready movement of the member to be punched relative to said matrix and die, said means including a balancing weight disposed on one end of a lever and a frame contacting and supported on the other end of said lever, said lever being pivotally connected intermediate its ends to motor means for controlling reciprocal movement thereof, sensor means responsive to the position of said member for controlling the operation of said motor means whereby the frame will be moved linearly until said sensor means engage said member at which time linear movement of the frame is halted and the die is actuated to punch a hole in said member.

4,012,978

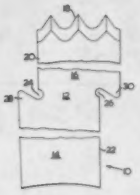
DIE CUTTING RULE

Jacques de Lanauze, 6421 Goncourt Ave., Ville d'Anjou, Quebec H1K 3X7, Canada

Filed Sept. 15, 1975, Ser. No. 613,560

Int. Cl.² B26F *1/38*

U.S. Cl. 83—669 **1 Claim**



1. A cutting rule segment adapted for interconnection with other like segments to form a cutting rule for mounting in a rotary die cutter, said rule segment comprising a body portion having a lower section for insertion in a slot in the rotary die cutter and an integral upper section having cutting teeth thereon;

marginal side edges on the body portion; a notch in each of said marginal side edges of the body portion whereby the notched marginal side edges present the lower section of the segment being offset with respect to the upper section on the notches sides;

the notch on one marginal side edge comprising an upwardly directed lip and a downwardly directed socket to engage and receive a downwardly directed lip and upwardly directed socket on the other marginal side edge of an adjacent segment whereby the notches on each segment engage and interlock with mating notches on adjacent rule segments to provide a substantially rigid unitary cutting rule.

4,012,979

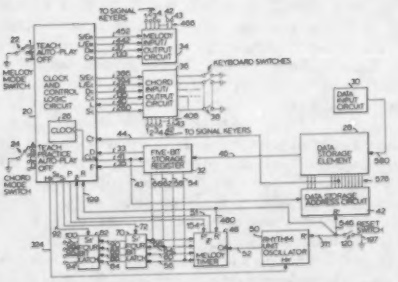
MUSIC TEACHING APPARATUS

Henry Wemekamp, Willowdale, Canada, assignor to Computeacher Limited, Toronto, Canada

Filed Mar. 3, 1975, Ser. No. 554,873

Int. Cl.² G09B *15/08;* **G10H** *1/00*

U.S. Cl. 84—1.01 **10 Claims**



1. Apparatus for teaching a student to play a musical instrument comprising:

a. programmable data storage means for storing a plurality of predetermined data words, said data words containing elements which are indicative of predetermined musical notes to be played, said data words being stored at known locations in said data storage means,

b. controllable logic means coupled to said data storage means for selecting predetermined data words and reading out said selected data words from said data storage means in response to a control signal,

c. means for sensing the notes which have been played,

d. means coupled to said sensing means for generating said control signal after said notes have correctly been played, and

e. display means coupled to said logic means for indicating visually the notes corresponding to the respective read-out data words.

4,012,980

CONTROL CIRCUITRY FOR A VOLTAGE-CONTROLLED TYPE ELECTRONIC MUSICAL INSTRUMENT

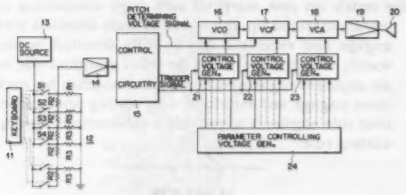
Tutomu Suzuki, Maisaka, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Nov. 26, 1975, Ser. No. 635,376

Claims priority, application Japan, Nov. 27, 1974, 49-143582

Int. Cl.² G10H *1/00, 5/02*

U.S. Cl. 84—1.01 **9 Claims**



1. In an electronic musical instrument comprising a keyboard having a plurality of keys; voltage divider circuit means coupled to said keyboard and adapted to provide a first signal which has a voltage value corresponding to a depressed key; control circuitry coupled to said voltage divider circuit means and providing a second signal indicative of the depression of the key and a third signal which is a function of said first signal; a storage means coupled to said control circuitry for storing said third signal; voltage-controlled tone signal generating means coupled to said storage means and adapted to produce a tone signal corresponding to the depressed key; and control voltage signal generating means coupled to said control circuitry and adapted to receive said second signal and to produce a control voltage signal the voltage of which varies as a function of time, the control voltage signal being coupled to said voltage-controlled tone signal generating means so as to control the tone signal to be generated thereby;

said control circuitry comprising:

a first gate means coupled to said voltage divider circuit means and having a first control electrode, said first gate means being rendered conductive in response to application of a first gate signal to said first control electrode;

a second gate means coupled between said first gate means and said storage means and having a second control electrode, said second gate means being rendered conductive in response to application of a second gate signal to said second control electrode; and

circuit means coupled to said voltage divider circuit means and responsive to voltage variation at the output of said voltage divider circuit means so as to provide the second signal for said control voltage generating means and the first and second gate signals for said first and second gate means, respectively.

4,012,981

ELECTRONIC MUSICAL INSTRUMENT PROVIDED WITH A WAVEFORM CONVERTER FOR CHANGING A SAWTOOTH WAVE TONE SIGNAL INTO A RECTANGULAR WAVE TONE SIGNAL

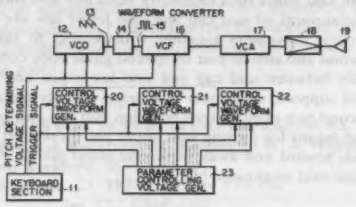
Yasuo Nagahama, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Oct. 7, 1975, Ser. No. 620,308

Claims priority, application Japan, Oct. 9, 1974, 49-115630

Int. Cl.² G10H *1/00, 5/00*

U.S. Cl. 84—1.01 **14 Claims**



1. An electronic musical instrument comprising sawtooth wave tone signal generating means, wave-form-converting means for receiving a sawtooth wave tone signal from said sawtooth wave tone signal generating means and converting the sawtooth wave tone signal into a rectangular wave tone signal, tone coloring filter means coupled to said waveform converting means, and musical sound-reproducing means coupled to said tone coloring filter means,

said waveform converting means comprising:

circuit means including an input coupled to said sawtooth wave tone signal generating means, an output coupled to said tone coloring filter means, a first bipolar transistor having base, collector and emitter electrodes, said base and collector electrodes being respectively coupled to said input and output for switching an output voltage level at said output from a first to a second voltage level when an input voltage at said input exceeds a given threshold voltage, first and second power supply terminals, and collector and emitter resistors for coupling said collector and emitter electrodes of said first bipolar transistor to said first and second power supply terminals respectively, said emitter and collector resistors having so large a total resistance value that when the input voltage at said input of said circuit means exceeds said threshold voltage, said first bipolar transistor is driven into saturation from cutoff; and

variable bias means coupled to said input of said circuit means to apply a bias voltage on said input of said circuit means for varying the duty factor of the rectangular wave tone signal.

4,012,982

PERCUSSION PROCESSOR FOR ELECTRONIC MUSICAL INSTRUMENT

James S. Southard, Union, Mich., assignor to C.G. Conn, Ltd., Elkhart, Ind.

Continuation of Ser. No. 562,174, March 26, 1975, abandoned. This application Mar. 19, 1976, Ser. No. 668,617

Int. Cl.² G10H *1/00, 5/00*

U.S. Cl. 84—1.01 **5 Claims**

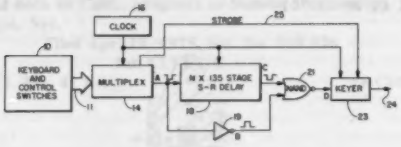
1. In an electronic musical instrument, wherein information representative of the actuation of selected switches corresponding to associated notes of the musical scale is furnished by a multiplex circuit in the form of a time-division multiplexed signal including a cyclically repeating sequence of time slots associated respectively with such switches, and in which a pulse in a time slot is indicative of the actuation of the switch associated with that time slot, a processing circuit including in combination:

first and second signal channels;

delay circuit means in said first signal channel having a delay period equal to N sequences of time slots, where N is a positive integer;

inverter circuit means in one of said signal channels;

means for supplying said multiplexed signal to the inputs of said first and second signal channels;



coincidence gate means with first and second inputs, the first input coupled with the output of said first signal channel and the second input coupled with the output of said second signal channel, for passing pulses in time slots of said time-division multiplexed signal only when a predetermined relationship of the signals applied to the first and second inputs thereof exists.

4,012,983

ACOUSTICAL REFLECTOR FOR WIND INSTRUMENTS

Thomas L. Ploeger, 38457 James Drive, Mount Clemens, Mich. 48043

Filed Sept. 9, 1975, Ser. No. 611,700
Int. Cl.² G10D 9/06
U.S. Cl. 84—400 **9 Claims**

1. In an acoustical reflector of the type having a panel with an acoustically reflective surface and bracket means on said panel including a clamp adapted to be mounted on the rim of the bell of a wind instrument for supporting said panel generally in front of the bell, improved structure wherein said bracket means comprises,

a rod connected with said panel by means including an articulable joint,

said clamp having means forming a socket which supports a portion of said rod,

said socket being so oriented that when said clamp is mounted on the rim of the bell of an instrument with which said reflector is adapted to be used when the axis of said rod is generally parallel to the axis of the instrument bell,

said rod portion being axially movable relative to said socket through a distance sufficient to facilitate locating said panel axially clear of the bell of the instrument when said panel is positioned in axial alignment with the bell,

said rod portion being rotatable relative to said socket for swinging said panel about said rod axis when said panel is so located and positioned,

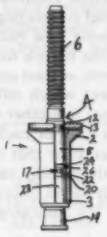
and means effective to secure said rod against axial and rotatable movement relative to said socket.

4,012,984

BLIND RIVET ASSEMBLY WITH LOCKING COLLAR ON RIVET STEM

Josip Matuschek, Newport Beach, Calif., assignor to Textron, Inc.

Filed June 19, 1975, Ser. No. 588,286
Int. Cl.² F16B 13/04
U.S. Cl. 85—70 **8 Claims**



1. In a blind rivet assembly

a tubular rivet sleeve having a preformed head at one end and an expandable sleeve tail on the other end thereof,

a stem extended through said sleeve and said head,

a tail former at the tail end of the stem adjacent said sleeve tail for expanding said tail,

a pulling portion on the pulling end of the stem adapted to be engaged by a tool for pulling the stem,

a plug portion of the stem adjacent said tail former,

a locking groove in the stem adjacent said plug portion,

the portion of the stem between said locking groove and said pulling portion being of smaller diameter than the interior diameter of said sleeve and head,

the improvement of,

a locking collar around said stem initially completely inside said sleeve spaced from said preformed head,

a locking head on said locking collar initially held in said locking groove whereby said locking collar moves with said stem through said sleeve,

said rivet head having a recess at the inner periphery of the rivet head,

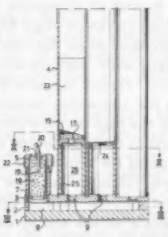
said locking collar being of such material as to be bulged outwardly into said head recess when obstructed from further movement with said rivet stem.

4,012,985

MULTIPLE LAUNCHER

Arnold Ingemar Magnusson, Bergfinksvagen 2, S-140 32 Grodinge, Sweden

Filed Feb. 26, 1975, Ser. No. 553,409
Claims priority, application Norway, Feb. 27, 1974, 740676
Int. Cl.² F41F 3/04
U.S. Cl. 89—1.818 **3 Claims**



1. Apparatus for launching a plurality of projectiles, comprising

a. a cavity having bottom, side and top wall portions;

b. a receptacle in communication with the cavity for receiving a cartridge providing on its explosion a gas pressure in the cavity;

c. a plurality of barrels for receiving projectiles, the barrels being mounted on the top wall portion of the cavity in proximity to one another, at least one of the barrels having an elevation which differs from the elevation of at least one other barrel;

d. a plurality of channels extending through the top wall portion, each channel connecting one of the barrels with the cavity and forming flow paths for said gas pressure from the cavity to the barrels for propelling said projectiles out of the barrels, at least one of the channels having a cross-sectional area which differs from the cross-sectional area of at least one other channel;

e. the cross-sectional area of each of the channels being substantially smaller than that of the respective barrel associated therewith, thereby causing the gas flow from the cavity into each barrel to reach critical velocity during at least part of the launching course.

4,012,986

VARIABLE-ELEVATION FIELD GUNS FOR MORTAR AND CANNON APPLICATIONS

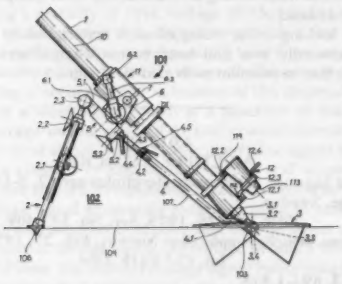
Raimond Germershausen, Kaarst, and Wilfried Becker, Duesseldorf, both of Germany, assignors to Rheinmetall G.m.b.H., Duesseldorf, Germany

Filed June 9, 1976, Ser. No. 694,235

Claims priority, application Germany, July 19, 1975, 2532354

Int. Cl.² F41F *21/12*

U.S. Cl. 89—17 **8 Claims**



1. In a field gun having an elongated barrel adjustable between a relatively high elevation angle for use as a mortar and a relatively low elevation angle for use as a cannon, barrel support means coaxial with and surrounding an intermediate portion of the barrel, means supported at first and second spaced base points for adjustably positioning the barrel support means between the high and low elevation angles, mortar breech means affixed to the positioning means and associated with the first base point for removably engaging the rear end of the barrel in firing relation when the barrel is at its upper elevation angle, and cannon breech means interchangeable with the mortar breech means and pivotally carried at a rear portion of the barrel for oscillation in a plane containing the barrel axis between a first forward inoperative position out of engagement with the rear end of the barrel and a second rear operative position engaged in firing relation with the rear end of the barrel when the barrel is at its lower elevation angle.

4,012,987

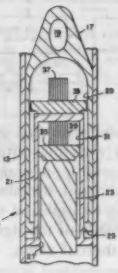
DUAL COMBUSTION MISSILE SYSTEM

John E. Burkhalter, and Richard H. Sforzini, both of Auburn, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 3, 1975, Ser. No. 610,027

Int. Cl.² F41F *3/02, 15/00*

U.S. Cl. 89—1.701 **4 Claims**



1. A missile system comprising:

a tubular launcher for directing a missile in a trajectory; and

a missile disposed for enclosure in said launcher and operation in said trajectory and provided with an ogival projectile and a housing with respective rearend stops, a slug and pairs of pistons and propellant grains disposed for simultaneous ignition;

said projectile and housing including respective combustion chambers with said pistons slidable to retain said propellant grains therein, said housing and slug respectively engaging said pistons, said projectile disposed for propulsion in the trajectory and said slug rearwardly responsive to the simultaneous ignition to control recoil of said launcher.

4,012,988

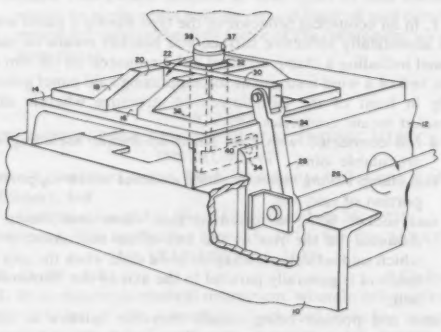
MECHANICAL FLY-AWAY LATCHING MECHANISM

Frederick W. Knight, Orlando, Fla., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 7, 1976, Ser. No. 693,254

Int. Cl.² F41F *3/04*

U.S. Cl. 89—1.806 **3 Claims**



1. A latching mechanism for releasably engaging a missile socket to prevent missile movement against transportation and handling loads comprising: a freely pivoted L-shaped restraint pin, said pin being provided with a circular end for engaging the missile socket; a slidable bar for holding said restraint pin in its engaged position and means for controlling movement of said bar to a disengaged position whereby said

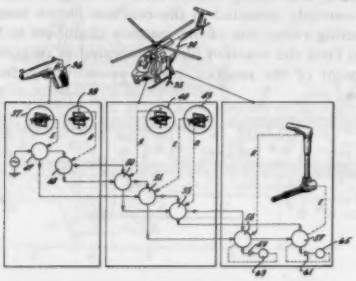
restraint pin can pivot out of said socket responsive to ignition of the missile motor.

4,012,989

INERTIAL FREE-SIGHT SYSTEM

Robert G. Hunt, Encino, and Theodore B. Edwards, Santa Ana, both of Calif., assignors to Summa Corporation, Las Vegas, Nev.

Filed Apr. 21, 1975, Ser. No. 569,926
Int. Cl.² F41G *3/10*
U.S. Cl. 89—41 EA **11 Claims**



9. An inertial hand-held sight system for slaving the axis of craft mounted armament means in parallel relation to a sighting device comprising:

a free independently movable sighting device adapted to be positioned on a line of sight to a target,

first and second inertial sensor means one of which provides information regarding the orientation of the craft, the other of which provides information regarding orientation of the sighting device, and

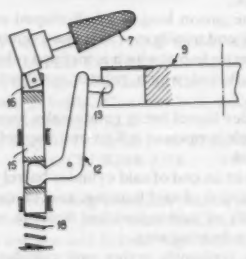
means to compare the information regarding craft orientation with the information regarding sighting device orientation to provide control information for maintaining the axis of said armament aligned with the axis of said sighting device independently of any changing orientation of the craft.

4,012,990

DEVICE FOR TRIMMING AND BEVELLING GEAR TEETH

Andre Wagner, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault, France

Filed Nov. 25, 1975, Ser. No. 635,038
Claims priority, application France, Nov. 28, 1974, 74.39023
Int. Cl.² B23F *19/10*
U.S. Cl. 90—1.4 **9 Claims**



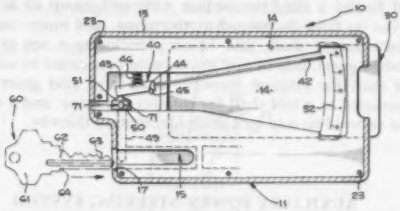
1. A device for removing the burrs from, and bevelling, gear teeth, comprising means for rotatably driving the gear to be treated, a first milling head mounted on a movable support, a milling cutter mounted for rotation in said milling head, a finger-shaped follower having a bearing surface to engage the periphery of the gear and to penetrate the space between adjacent gear teeth, whereby rotation of said gear imparts radial movement of said follower conforming to the peripheral outline of the gear, a bell-crank lever mounted on a pivot rigidly having a first arm connected to said follower, and a second arm rigid with said first arm and having means engaging a slide for movement therewith, said slide movable within a fixed guide, said slide having means engaging said movable support to move said milling head and said milling cutter transverse to said gear so that said milling cutter operates on said gear teeth.

4,012,991

KEY DECODING AND DUPLICATING APPARATUS AND METHOD

Tim M. Uyeda, South San Gabriel, Calif., assignor to Klaus W. Gartner, La Palma, Calif.

Filed June 2, 1975, Ser. No. 582,639
Int. Cl.² B23C *1/16*; B23F *23/08*; B21K *13/00*
U.S. Cl. 90—13.05 **8 Claims**



1. In a method for decoding and duplicating a key wherein said key includes a shank portion having a plurality of spaced transverse notches of differing depths, the notches of said key being coded to predetermined coded depth, said method comprising the steps of:

inserting coded indicia bearing means into a housing, said indicia bearing means including thereon corresponding to a sequential index related to a predetermined coded depth of the notches of said key;

inserting a key having a shank portion with notches of the same predetermined coded depth as said coded indicia bearing means into said housing until one of said notches in the shank portion of said key engages indicating means movably on said housing and moving said indicating means across said sequential index of said coded indicia bearing means until said indicating means indicates the coded depth of the notch engaged by said indicating means;

recording the coded depths of each of said transverse notches on said key inserted into said housing;

locating a blank key of appropriate type on apparatus for duplicating a decoded key at a predetermined location thereon;

locating a coded indicia bearing card having the same indicia thereon as said first-mentioned coded indicia bearing means on said apparatus in a position to be observed; and

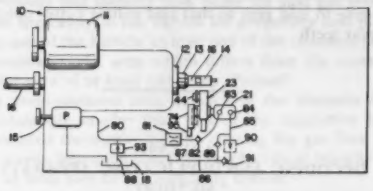
causing an indicator to move relative to said card in response to the depth of cut to be produced on said blank key by an associated key cutting means; and

visually comparing the location of said indicator with selected ones of said indicia on said card corresponding to the code for cutting the key to determine a desired depth of cut for a notch being cut in said key blank by said cutting means.

4,012,992
HYDRAULICALLY OPERATED ATTACHMENT FOR MACHINE TOOLS

Donald E. Smrekar, Burlington; Peter Bilan, Burlington, and James Hamilton, Campbellford, all of Canada, assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Nov. 12, 1975, Ser. No. 631,039
Int. Cl.² B23C *7/02*
U.S. Cl. 90—15 R **10 Claims**

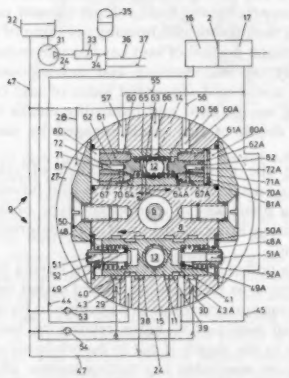


1. In combination, a machine tool having means for supporting and rotating a work piece and having a slide movable toward said work piece, a hydraulic pump, means for driving the pump, a closed housing mounted on the slide for movement therewith, a rotary hydraulic motor separate of the housing but fixedly attached thereto for movement therewith and having a fluid connection with said pump so as to be driven by fluid discharged by the pump, said motor having a rotary output shaft, said housing enclosing a set of intermeshed gears, one of said gears being connected to said output shaft for rotation thereby, another of said gears being connected to a tool shaft for rotating the same, and a cutting tool secured to said tool shaft for rotation thereby.

4,012,993
AUXILIARY POWER STEERING SYSTEM

Erich Jablonsky, Boebingen, Rems, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Continuation-in-part of Ser. No. 357,603, May 7, 1973, Pat. No. 3,927,604, which is a continuation-in-part of Ser. No. 266,053, June 26, 1972, Pat. No. 3,855,904. This application Sept. 22, 1975, Ser. No. 615,169
Claims priority, application Germany, Oct. 12, 1974, 2448702
Int. Cl.² F15B *9/10*
U.S. Cl. 91—371 **6 Claims**

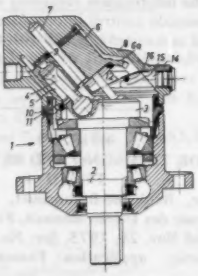


1. In combination with a source of pressurized fluid for a vehicle having a pump (**31**), a low pressure fluid reservoir (**32**) and an accumulator (**35**) within which a high storage pressure is developed and a manually operable auxiliary power steering system having a servomotor (**2**) displaceable under control of a steering spindle (**7**) engageable with a control valve assembly (**11**) which is displaceable, against the bias of centering spring means (**48** and **48A**) from a neutral position in which flow of pressurized fluid from the source to the servomotor is blocked, to operating positions in which the servomotor is connected to the accumulator and the reservoir; reaction force generating means for yieldably resisting displacement of the steering spindle, comprising a valve body (**8**) enclosing a pair of opposing reaction chambers (**80** and **80A**), a reaction piston assembly (**10**) movably mounted in the valve body and exposed to opposing pressures in said reaction chambers, and spring biased force limiting means (**62** and **62A**) movably mounted in the reaction piston assembly for connecting either one of the reaction chambers to the reservoir to limit the reaction force generated in response to displacement of the reaction piston assembly by the steering spindle.

4,012,994
AXIAL BEARING DEVICE FOR THE CYLINDER BARREL IN AN AXIAL PISTON MACHINE

Sten Axel Torby Malmros, Trollhattan, Sweden, assignor to Volvo Flygmotor Aktiebolag, Trollhattan, Sweden

Filed May 5, 1975, Ser. No. 574,668
Int. Cl.² F01B *3/00, 13/04*
U.S. Cl. 91—499 **3 Claims**

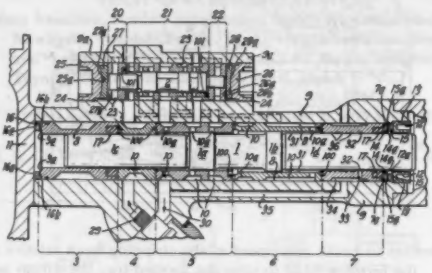


1. An axial piston pump of the bent-axis type comprising:
a rotatable shaft,
a drive disk,
at least one piston having a ball-shaped end supported on said disk and axially movable in a cylindrical bore formed in a cylinder barrel which is inclined relative to the axis of said shaft and which rotates synchroniously with said shaft,
said cylinder barrel being rotationally journalled in a housing which is open at a first end thereof adjacent to said drive disk,
a raceway at an end of said cylinder barrel which is adjacent said first end of said housing, said raceway being radially outwardly of said cylindrical bores in said barrel for receiving a bearing ring,
means for resiliently urging said cylinder barrel against a valve disk at the other end of said housing, said urging means comprising an elongated leaf spring whose one end is fixed at a predetermined position on the interior of said housing and whose other end engages said bearing ring.

4,012,995
ASSEMBLIES WHICH COMPRISE AXIALLY SLIDABLE PISTONS/SPOOLS

Philip Butterworth, Cockermouth, England, assignor to Butterworth Hydraulic Developments Limited, London, England

Filed Apr. 30, 1975, Ser. No. 573,047
Claims priority, application United Kingdom, May 6, 1974, 19749/74
Int. Cl.² F16J 11/04
U.S. Cl. 92—152 **2 Claims**



1. An assembly which comprises a piston slidable in a piston cylinder in which the piston cylinder is at least partly defined by at least two substantially annular piston cylinder blocks which are received axially within a substantially complementary cylindrical bore of a housing of the assembly, said cylinder blocks forming an axially extending array with adjacent end faces of adjacent cylinder blocks in substantially face-to-face abutment; retaining means at each axial end of the array of cylinder blocks and axially retaining said blocks in the bore of the housing; each retaining means comprising a retaining component on the housing, the retaining component of at least one retaining means being axially adjustable to apply pressure axially to the cylinder blocks in the array and therethrough to the retaining component at the other end of the array, and wherein each retaining means further comprises substantially complementary slidably engaging part spherical surfaces which are substantially coaxial with the bore and through which said axial pressure is applied between the retaining components and the cylinder blocks, at least one of the part spherical surfaces of each retaining means being carried by a member disposed axially between the retaining component and the cylinder block which are adjacent to that member, each said member being capable of radial displacement relative to the axis of the bore to accommodate for slight axial misalignment between the retaining components and the cylinder blocks and alleviate axially off-set pressure which may otherwise be applied from the retaining components to the cylinder blocks.

4,012,996
APPARATUS FOR FOLDING AND COMPRESSION OF CORRUGATED CONTAINER BLANKS

Walter J. Stolkin, Chicago; William A. Riley, Woodridge, both of Ill., and Henry J. Sejda, Munster, Ind., assignors to Stolmar Corporation, Chicago, Ill.

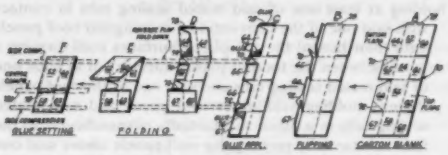
Filed May 9, 1975, Ser. No. 576,095
Int. Cl.² B31B 1/58
U.S. Cl. 93—36.3 **10 Claims**

1. Apparatus for processing container blanks to which adhesive has been selectively applied, said blanks having inner and outer side panels and top and bottom flaps attached to each of said panels, comprising:

first means receiving said blanks for folding the outer side panels over onto the inner panels to join the outer side panels together along an adhesive bearing portion;

second means receiving the folded blanks from said first means for compressing the inner and outer side panels against each othe to permit the adhesive to set for permanently securing said outer panels one to the other.

third means for compressing said blank at predetermined locations to spread the applied adhesive thereover and to



permit said adhesive to set, said third means including compression rollers disposed above and below the folded blank cooperating to compress the blank therebetween to spread the adhesive over the surface area of the blank subjected to said rollers.

4,012,997
METHOD FOR FORMING A LIQUID-TIGHT FLAT TOP CONTAINER

George L. Bachner, and Jerry G. Bachner, both of Barrington, Ill., assignors to Nimco Corporation, Crystal Lake, Ill.

Division of Ser. No. 488,852, July 15, 1974. This application Aug. 6, 1975, Ser. No. 602,286
Int. Cl.² B31B 1/26
U.S. Cl. 93—36.8 **2 Claims**

1. A method for forming a flat top closure for a conventional paper carton, said conventional paper carton comprising four substantially rectangular wall panels having a bottom closure forming a liquid-tight tubular container wherein the method comprises the steps of:

cutting a blank of foldable sheet material for forming a conventional tubular container with substantially a gable top pattern;

scoring the blank of foldable sheet material with a conventional gable top fold pattern;

scoring the blank of foldable sheet material with a top fold score line running across and parallel to the top edges of one of the conventional rectangular roof panels and across the two triangular fold-in tabs immediately adjacent to said one of the conventional rectangular roof panels;

forming the blank of foldable material into a conventional gable top container with sloping roof panels, and mated sealing tabs extending vertically from the slanting roof panels with said top fold score line appearing on said one of the conventional rectangular roof panels;

folding said one of the conventional rectangular roof panels of said conventional gable top container inward along said top fold score line;

heating the thermo-plastic surfaces of one of the conventional rectangular roof panels and said mated sealing tabs;

forcing said top fold score line downward and toward the other roof panel of said conventional gable top container until the other roof panel lies in a plane substantially perpendicular to the four substantially rectangular wall panels above said one of the conventional rectangular roof panels;

pressing said other roof panel and said mated sealing tabs downward until said other roof panel and said mated sealing tabs lie in contact with said one of the conventional rectangular roof panels in a plane substantially perpendicular to the four substantially rectangular wall panels above said one of the roof panels;

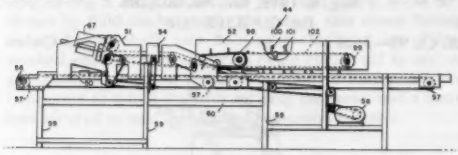
holding at least one of said mated sealing tabs in contact with said one of the conventional rectangular roof panels until their heated thermo-plastic surfaces cool forming a bond between the thermo-plastic surfaces of at least one of said mated sealing tabs and said one of the roof panels thereby holding said other roof panel and said mated sealing tabs in a plane substantially perpendicular to the four substantially rectangular wall panels above said one of the conventional rectangular roof panels resulting in a flat liquid-tight top closure.

4,012,998

CARTON SEALING METHOD AND APPARATUS

Ralph K. Daugherty, and Lynn D. Crawford, both of San Jose, Calif., assignors to Genevieve I. Hanscom and Genevieve I. Hanscom, Robert M. Magnuson & Lois J. Thomson, Trustees of the Estate of Roy M. Magnuson, all of, Calif., part interest to each

Filed Sept. 17, 1975, Ser. No. 614,351
Int. Cl.² B31B *17/02*
U.S. Cl. 93—39 R **9 Claims**



1. A method for sealing a lid onto a tray to form a carton wherein the tray comprises a multi-sided container with an open top and the lid comprises a center panel having pairs of side and end flaps adapted to bend down along the tray sides, said method comprising:

conveying the tray along a preselected path;

feeding a tray blank along a path elevated above the tray preselected path and positioning said lid blank above the tray such that the center panel thereof coincides with the tray outline;

treating one surface of each lid blank side panel prior to positioning the lid blank over the tray so the surface will stick to the tray;

folding the panel extending in the direction the lid blank and tray are being moved down along the adjacent tray side and holding said panel in said position so as to position the lid blank center and precisely over the tray; and

folding the remaining lid blank side panels down along the adjacent sides of the tray.

4,012,999

APPARATUS FOR FORMING TRAYS

Lynn D. Crawford, San Jose, Calif., assignor to Genevieve I. Hanscom and Genevieve I. Hanscom, Robert M. Magnuson and Lois J. Thomson, Trustees of the Estate of Roy M. Magnuson, all of, Calif., part interest to each

Filed Sept. 17, 1975, Ser. No. 614,433
Int. Cl.² B31B *1/44*
U.S. Cl. 93—51.1 **11 Claims**

1. A tray forming apparatus for forming a tray from a blank having a bottom panel and side forming panels with a fold line therebetween, said apparatus comprising, in combination:

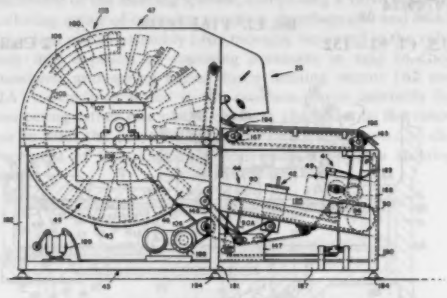
a plurality of mandrel assemblies having a forming head about which the blank can be folded to form the tray;

a die assembly to cause folding of the blank about the forming head with passage of each mandrel assembly therethrough;

a stripping head mounted in each mandrel assembly for movement relative to the forming head to remove the formed tray from the forming head;

means to position a blank onto each forming head;

means to effect relative movement between the die assembly and each forming head to move the forming heads through the die assembly in succession to form the blank about each forming head;



means to cause movement of the stripping head relative to the forming head to strip the formed tray therefrom and clamp the formed tray between the stripping head and the next adjacent mandrel assembly; and

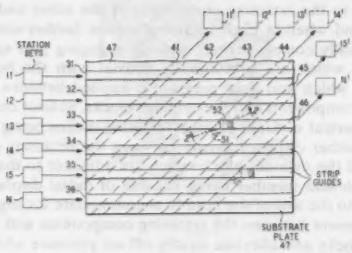
means to remove the formed tray from the mandrel assembly.

4,013,000

OPTICAL CROSSBAR SWITCHING NETWORK

Herwig Werner Kogelnik, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 20, 1975, Ser. No. 633,719
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 C **7 Claims**



1. An optical switching network of the type employing a plurality of optical crosspoints to provide connections in an NxN network of optical waveguide communication channels, characterized in that a first plurality N of the optical waveguide channels are parallel to each other and define a first plane, a second plurality N of optical waveguide channels are parallel to each other and define a second plane which is parallel to said first plane, said waveguide channels in said first plane crossing over said waveguide channels in said second plane without intersection, each region of closest approach of one waveguide channel from said first plurality N of waveguide channels to a second waveguide channel in said second plurality N of waveguide channels defining a proposed switching crosspoint, and further characterized by including at each of the proposed switching crosspoints a first beam-to-guide (grating-type) coupler to couple the modulated optical energy from said one waveguide channel of the first plurality of waveguide channels, and laterally disposed therefrom in a direction chosen to define the optical communication path between

waveguide channels a second beam-to-guide coupler to couple the energy from the first coupler into said second waveguide channel of the second plurality of waveguide channels, each of said first and second couplers being controllable between noncoupling and coupling conditions with respect to its related waveguide channel.

4,013,001

FRUIT TREATING APPARATUS

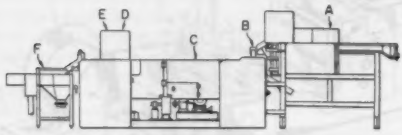
Sato Yasuhiro, Sendai; Sato Toshio, Izumi; Kawasaki Shuichi, Kawasaki; Takaishi Toshio, Izumi; Okuyama Sadao, Sendai, and Yamanashi Norio, Shimizu, all of Japan, assignors to Toyo Seikan Kaisha Limited, Tokyo, Japan

Filed July 3, 1974, Ser. No. 485,556

Claims priority, application Japan, July 6, 1973, 48-80349

Int. Cl.² A23N *4/12; A47J 25/00; A23N 4/24*

U.S. Cl. 99—550 **27 Claims**



1. A fruit slivering and pitting device in which fruit is transported along a path to a first station where the fruit is slivered and then transported to a second station where the fruit is pitted comprising a main frame, a slivering mechanism having an upper cutter and a lower cutter movable towards each other to a slivering position to sliver a fruit therbetween, means mounting said upper and lower cutter for vertical movement toward and away from each other in a direction transverse to the direction of travel of the fruit, said slivering mechanism mounted on said main frame at said first station in the path of travel of the fruit, and a pitting mechanism having an upper rotary cutter and a lower rotary cutter cutter movable towards each other to a cutting position to put a fruit therebetween, said means mounting said upper and lower cutters for vertical movement also mounting said rotary cutters for vertical movement toward and away from each other in a direction parallel with the movement of said upper and lower cutters of said slivering mechanism, said pitting mechanism mounted on said main frame downstream of said slivering mechanism at said second station in the path of travel of the fruit, whereby the flesh of the fruit is slivered at said first station, and the pit is removed from said slivered fruit at said second station.

4,013,002

PROCESS AND APPARATUS FOR ACTUATING THE RAM WEIGHT COMPENSATION MECHANISM OF A PRESS

Franz Schneider, and Burkhard Schumann, both of Goppingen, Germany, assignors to L. Schuler GmbH, Germany

Filed Mar. 24, 1975, Ser. No. 561,165

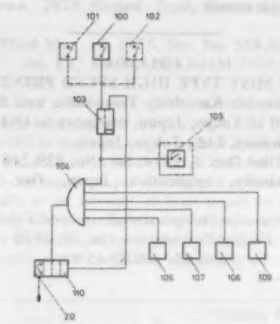
Claims priority, application Germany, Mar. 26, 1974, 2414409

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B30B *13/00*

U.S. Cl. 100—35 **21 Claims**

1. A process for the positive actuation of a weight compensating mechanism for a ram of a press comprising the steps of detecting at least one condition indicative of the changing of a tool set of the press, preventing working operation of the press in response to the detection of a condition indicative of the changing of a tool set, and subsequently initiating operation of the weight compensating mechanism for the ram of the press.



4,013,003

PRESS WITH TOGGLE JOINT DRIVE MECHANISMS

Kurt Finsterwalder, Goeppingen, and Günter Riedisser, Eislingen, both of Germany, assignors to L. Schuler GmbH, Germany

Filed Jan. 19, 1976, Ser. No. 650,065

Claims priority, application Germany, Jan. 17, 1975, 2501748

Int. Cl.² B30B *1/14*

U.S. Cl. 100—285 **11 Claims**

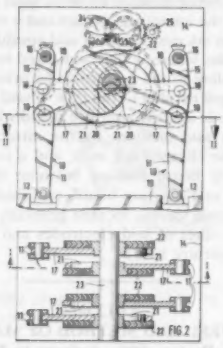


FIG 2

1. Press comprising:

press frame means,

a press ram guidably supported at said press frame means,

a plurality of toggle joint drive mechanisms, each of said toggle joint drive mechanisms including a drive member, a first link member, and a second link member, said first link member having one protion thereof pivotally connected to a ram coupling point of said press ram and another portion thereof pivotally connected to a first coupling point of said drive member, said second link member having one portion thereof pivotally connected to a frame coupling point of said press frame means and a second portion thereof pivotally connected to a second coupling point of said drive member at a position spaced from and facing said first coupling point,

and rotatable drive means for applying driving forces to said drive members,

wherein each drive member is an acute-angled triangular guide member having the acute angle corner thereof

connected to said drive means for movement therewith, and wherein said first and second coupling points are at respective corners of said guide member other than said acute angle corner.

4,013,004

INK MIST TYPE HIGH SPEED PRINTER

Akinori Watanabe; Katsuhide Tanoshima, and Matsusaburo Noguchi, all of Tokyo, Japan, assignors to Oki Electric Industry Company, Ltd., Tokyo, Japan

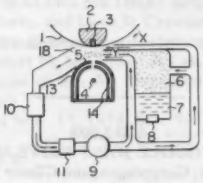
Filed Dec. 3, 1974, Ser. No. 529,214

Claims priority, application Japan, Dec. 10, 1973, 48-136885

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976

Int. Cl.² G03G *15/04*

U.S. Cl. 101—1 **3 Claims**



1. An ink mist type printer for use in printing information on a printing medium, comprising means for generating an ion stream including a pair of spaced electrodes to which a high voltage is applied; means positioned between said electrodes for modulating said ion stream including an electrically controlled aperture board having a plurality of apertures therein, said apertures being positioned in at least one aligned row through which the ion stream passes and is modulated, means for supplying an ink mist between said aperture board and one of said electrodes whereby the modulated ion stream charges the mist according to the pattern to be printed on a printing medium arranged parallel to the flow of said ink mist between said one electrode and the aperture board whereby characters are printed on said medium by the attraction to said one electrode of the charged ink mist; and a conductive corona discharge shield board located between the other of said electrodes and said aperture board, said shield board having a narrow slit formed therein located generally in parallel alignment with the other of said electrodes and the row of apertures in said aperture board.

4,013,005

PRINT WHEEL AND METHOD OF MAKING SAME

Jack D. Keefe, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Sept. 18, 1973, Ser. No. 398,519

Int. Cl.² B41J *1/22*

U.S. Cl. 101—110 **15 Claims**

1. Method of making a print wheel, comprising the steps of: molding an elongated, unitary, printing band composed of polymeric material and having complementary lugs at its marginal ends, providing a generally annular base having an undercut recess open at the periphery of the base by a gap which is narrower than the combined thickness of the lugs and open at a side of the base and with the length of the band about the periphery of the base being less than the peripheral extent of the base, bringing the band at least partially around the base under tension, and inserting the complementary lugs through the open side into the undercut recess so that the band is maintained on the base under tension.

4,013,006

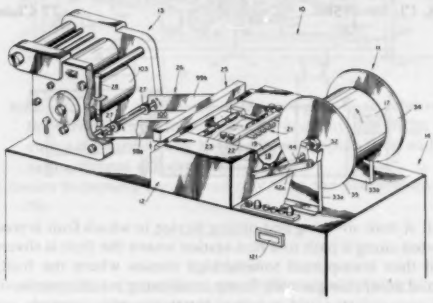
ROLL-FED SHEET PRINTING APPARATUS

Dale F. Burrell, and Alan Strihafka, both of Kennesaw, Ga., assignors to Burrelico, Inc., Kennesaw, Ga.

Filed July 9, 1975, Ser. No. 594,496

Int. Cl.² B41F *13/56*

U.S. Cl. 101—227 **2 Claims**



1. Apparatus for providing printed sheets from a continuous web of printing stock, comprising:

support means to receive and dispense a continuous web of printing stock;

means operative to receive the continuous web of stock from said support means and selectively operative to withdraw a length of said stock from the continuous web;

means responsive to the passage of stock withdrawn from the continuous web to provide a first signal condition indicating that a certain length of stock has been withdrawn from the continuous web;

stock cutting means positioned in operative relation to said stock withdrawn from the continuous web and operative in response to said first signal condition to cut said certain length of stock from the web to furnish a separate sheet of said stock;

means operative to provide a second signal condition indicating that said stock cutting means has operated;

printing means positioned to serially receive said separate sheet cut from the continuous web by said cutting means and operative in response to said second signal condition to perform a printing operation on said separate sheet;

said means responsive to the passage of withdrawn stock being operative to measure the length of stock withdrawn from the continuous web and to provide said first signal condition when the measured length corresponds to a previously determined length for said separate sheet;

said means responsive to the passage of withdrawn stock comprising pulse generating means operative to generate a pulse signal in response to passage of each increment of withdrawn web, said increment of length being less than said previously determined length for said separate sheet;

counting means operative to maintain a pulse count signal condition in response to said pulse signals from said pulse generating means; and

comparator means responsive to said pulse count signal condition and to a present reference count signal condition to provide said first signal condition when the pulse

count corresponding to said pulse count signal condition is equal to said reference count signal.

4,013,007

SELF-INKING HAND STAMP

Harold M. Flynn, 5138 E. Taylor St., Phoenix, Ariz. 85008

Filed Sept. 17, 1975, Ser. No. 614,257
Int. Cl.² B41K *1/42*
U.S. Cl. 101—333 **4 Claims**

1. A hand stamp assembly comprising an upright body frame having matched elongated slots including a base to be thrustingly engaged with an object to be imprinted, a printing frame, a printing unit within the body frame and operatively coupled with said printing frame by means of connecting means from the printing unit to the printing frame riding in said slots, said printing unit having character-carrying means movable to shift different printing characters thereon into printing position facing toward said base, and means normally biasing the printing frame and thereby the printing unit into a retracted position on the body frame away from said base and from which position the printing frame can be moved in opposition to the biasing means to drive the printing characters into imprinting engagement with an object against which the base is thrustingly engaged, including:

said printing frame having a pair of spaced side bars,

said bars each having a matching control cam slot therein,

each cam slot having a matching shoulder lateral to the longitudinal axis of each cam slot,

the shoulders stopping the travel of the printing unit away from the object,

each of the shoulders comprising a portion of the periphery of each cam slot,

said connecting means being operatively engaged in said cam slots and said elongated slots to effect swinging of the printing unit between a position wherein an inking pad is in inking contact with the printing characters at a position laterally of the longitudinal axis of said body frame to a clearance position in said printing frame to permit movement of the printing frame and the printing unit in opposition to said biasing means and relative to said body frame to effect imprinting by the inked printing characters upon an object against which the base is thrust, and

means mounted on said base at the end which engages the object to be imprinted for causing the imprinting to occur at an acute angle to the longitudinal axis of the hand stamp assembly,

said means comprising pads mounted on said base wherein the thickness of the pads on one side of said base are greater than the thickness of the pads on the other side of the base.

4,013,008

METHODS AND SOLUTIONS FOR IMPROVEMENT OF OFFSET PRINTING

Dorvin Brown, 2925 Sinbad Trail, Farmers Branch, Tex. 75234

Filed Mar. 17, 1975, Ser. No. 558,667
Int. Cl.² B41N *3/08*; **B41M** *1/02*
U.S. Cl. 101—451 **3 Claims**

1. A method of offset printing with a metal printing plate of the kind which is susceptible to corrosion and which tends to accumulate dirt in the non-image regions thereof, comprising dampening the surface of said plate in the non-image regions thereof with an aqueous polyphosphate solution containing polyphosphate in an amount at least equal to about 0.6 g/l prior to inking said plate and taking an impression therefrom, in which the aqueous polyphosphate solution consists essentially of a concentrate consisting essentially of:

	Volume Per Cent
Sodium tripolyphosphate	4.3
Sodium hexametaphosphate	21.5
Aminomethylenephosphonate	0.8
Water	73.4

diluted to a use concentration between about 0.6 g/l and about 3 g/l.

4,013,009

ILLUMINATING PROJECTILES AND PYROTECHNIC DEVICES

Pierre M. R. Claude; Robert E. Gencey; Jean-Paul Mottry, and Rene H. Cayre, all of Bourges, France, assignors to Etat Francais, France

Filed Feb. 7, 1975, Ser. No. 547,931
Claims priority, application France, Feb. 8, 1974, 74.04213
Int. Cl.² F42B *13/40*
U.S. Cl. 102—35.6 **13 Claims**

1. An illuminating projectile adapted to be launched by a rifled-tube unit, comprising:

a. a body;

b. a container releaseably connected to said body;

c. a first ejection charge means for disconnecting said container from said body after a predetermined period of time, said container being subjected to rotational and translational movement after being disconnected from said body;

d. a small parachute, connected to said container, for braking the translational movement of said container;

e. first means, connected to and acting on said container, for reducing the rotational speed of said container;

f. an illuminating flare releaseably connected to said container;

g. a second ejection charge means for disconnecting said illuminating flare from said container after a predetermined period of time, said illuminating flare being subjected to residual rotational and translational movement after being disconnected from said container;

h. a large parachute, connected to said illuminating flare, for braking the residual translational movement of said illuminating flare; and

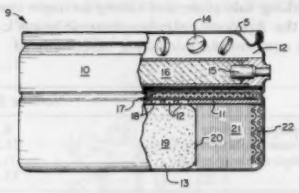
i. second means, connected to and acting on said illuminating flare, for reducing the residual rotational speed of said illuminating flare.

4,013,010

GAS GENERATOR WITH EXPANDABLE CARTRIDGE

Fred E. Schneiter, North Ogden; Philip R. Dykstra, and Carver G. Kennedy, both of Brigham City, all of Utah, assignors to Thiokol Corporation, Newtown, Pa.

Filed Nov. 4, 1974, Ser. No. 520,577
Int. Cl.² F42B *3/04*
U.S. Cl. 102—39 **6 Claims**



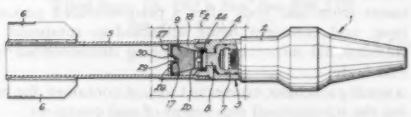
1. A gas generator comprising: a housing comprising two half shells forming a box-like structure with orifices therein, and a plurality of orificed, hollow cylinders inside said structure, the ends of the cylinders being closed by the half shells; and expendable cartridge in each of the cylinders comprising an easily-rupturable, hermetically-sealed container; a perforated partition dividing the container into first and second chambers; gas generant material in the first chamber; an ignition means contiguous with the gas generant material; gas cooling means adjacent the inner wall of the second chamber of the container; and pH neutralizing material between the cooling means and the perforations of the partition, so that gases from the burning gas generant material passing through the perforations in the partition must pass through the pH neutralizing material--the housing closely supporting the container on all sides except for the orifice sites in the surrounding cylinder, which are adjacent the cooling means, whereby gases passing through the cooling means may rupture the container only at the orifices.

4,013,011

THROWING DEVICE FOR GRENADES

Andre Gabriels, Genk, Belgium, assignor to Fabrique Nationale Herstal S.A., Herstal-lez-Liege, Belgium

Filed Aug. 27, 1975, Ser. No. 608,396
Claims priority, application Belgium, Apr. 8, 1975, 54254
Int. Cl.² F42B *11/42*
U.S. Cl. 102—65.2 **8 Claims**



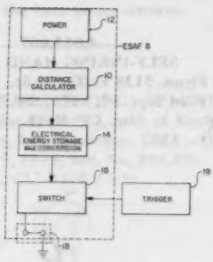
1. A device for firing a grenade or the like from a weapon such as a gun, comprising: a tubular casing affixed to the rear of the grenade; abutment means on the inner wall of said tubular casing; a bullet trap in said tubular casing between said abutment means and said grenade, said bullet trap comprising a hard mass under the form of a truncated revolution body and a substantially rigid metal bearing disc adjoining at one side thereof, the large base of said hard mass, the other side of said bearing disc engaging said abutment means, the small base of said hard mass being supported by a portion of the body of said grenade.

4,013,012

ELECTRONIC SAFE ARMING AND FUZING SYSTEM

Louis Robert Giattino, Hollister, Calif., assignor to Altus Corporation, Cupertino, Calif.

Filed Nov. 18, 1974, Ser. No. 524,558
Int. Cl.² F42C *15/40*
U.S. Cl. 102—70.2 R **6 Claims**



1. A system for arming a warhead of a missile after said missile has reached a predetermined distance from a launch vehicle and detonating said warhead upon the occurrence of a triggering event, said apparatus comprising:

an exploding bridge wire imbedded in the explosive of said warhead;

a first system branch comprising:

first accelerometer means for detecting a predetermined acceleration force and closing a first switch upon experiencing said acceleration force;

voltage regulator means electrically connected to said first accelerometer means such that electric energy is supplied to said regulator means when said switch is closed;

energy conversion means connected to said regulator means for converting a relatively low direct current voltage to a relatively high direct current voltage;

capacitor means connected to the output of said converter means for storing electrical energy;

switch means connected between said energy storage means and said exploding bridge wire for allowing said stored energy to pass through said exploding bridge wire upon the occurrence of said triggering event;

a second system branch comprising:

second accelerometer means for generating an output signal upon detecting said predetermined acceleration force;

electronic timer means connected to said second accelerometer, said timer means being adapted to generate an output signal a predetermined time period after receiving the output signal from said second accelerometer means; and

means interconnecting said timer means and said first system branch for preventing energy from reaching said capacitor means prior to the receipt of the output signal from said timer means.

4,013,013

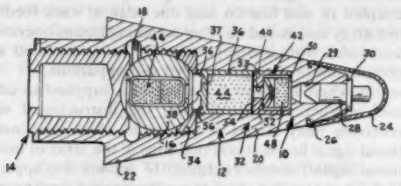
ORDNANCE FUZE TIME DELAY MECHANISM

Dale M. Davis, Freeport, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 12, 1975, Ser. No. 631,279
Int. Cl.² F42C *9/10*
U.S. Cl. 102—72 **8 Claims**

1. In a fuze having a body and a detonator assembly the improvement therein being a fuze delay mechanism comprising a first housing in operative relationship with said detonator assembly, a propellant having a predetermined burning rate located within said first housing, a second housing located adjacent said first housing, a primer having a predetermined

burning-rate located within said second housing, means operatively connected to said primer for initiating an ignition of said primer, said second housing containing an aperture therein adjacent said first housing, means located between said aperture and said first housing for separating said first housing and said second housing, said separating means capable of being ruptured at a predetermined time after the ignition of said primer and said first housing having a shear disc on the end



opposite said separating means, said shear disc being capable of shearing when acted upon by a predetermined pressure build-up within said housings, whereby the ignition of said primer causes a subsequent ignition of said propellant thereby increasing the pressure within said housings to said predetermined level and said increase in pressure causes the shearing of said shear disc and subsequent detonation of said detonator assembly at a predetermined time delay after the initial ignition of said primer takes place.

4,013,014

CIRCUIT ARRANGEMENT FOR A TRACK-BOUND PROPULSION VEHICLE

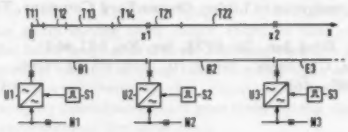
Joachim Holtz, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 3, 1975, Ser. No. 610,054

Claims priority, application Germany, Sept. 18, 1974, 2444679

Int. Cl.² H02P *7/46*

U.S. Cl. 104—148 LM **7 Claims**



1. A circuit arrangement for use with a trackbound propulsion vehicle which is supplied by a linear synchronous motor having an exciter which is disposed as a co-movable translator on said vehicle, said circuit arrangement including:

a traveling field winding disposed along the roadbed followed by said vehicle, said winding forming a stator for said motor and having an acceleration span which includes a number of acceleration sections;

a number of converters each of which supplies one of said acceleration sections with an ac voltage of variable frequency and amplitude; and

at least one of said acceleration sections including:

a number of interconnected subsections through which the same current from the converter supplying said one acceleration section flows, each of said subsections having a number of poles and phases and a number of transversal conductors per pole and phase which is inversely proportional to a predetermined velocity of said vehicle in that subsection.

4,013,015

COUPLING AND BRAKING DEVICE FOR TOW PIN DRIVEN FLOOR TRUCKS

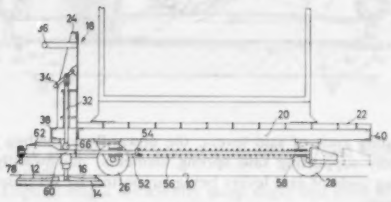
Hans-Georg Fromme, Stuttgart, and Günter Böttner, Wolfschlugen, both of Germany, assignors to Thyssen Aufzuege GmbH., Stuttgart, Germany

Filed Aug. 25, 1975, Ser. No. 607,554

Claims priority, application Germany, Aug. 24, 1974, 2440681

Int. Cl.² B61B *13/00*

U.S. Cl. 104—172 BT **19 Claims**



1. Coupling and braking device for rail supported transportation equipment, especially tow cars, which are guided along a floor groove by means of drive rods arranged at their front end and which are entrained by an underfloor tow chain, each car having rigid front and rear fenders and a substantially horizontally guided front fender movable with a movement component oriented at an angle to the travel direction, whereby the movable fender reaches forwardly beyond the rigid front fender and, when running up against a stop barrier or against a standing car, disengages the drive rod from the drive chain by means of a connecting mechanism moving against a return spring, while simultaneously displacing a latching device from a forward, passive position into a rearward activated operating position, the latching device being displaced into its activated operating position as a result of its attachment to the connecting mechanism, the device of the invention being characterized in that a spring loaded return means is provided as part of the mechanical connection between the forward movable fender (**44**) and the latching device (**72; 118**) and that the rearwardly arranged latching device (**72; 118**) is so arranged that, when it is in its activated operating position, it blocks the motion component, oriented at an angle to the travel direction, which results from the return force acting on the movable front fender (**44**) and connecting mechanism (**52; 102**) of the succeeding car which has run up against this car.

4,013,016

RAILROAD CAR TRUCK SUSPENSION SYSTEM

Elwood H. Willets, 102 S. Penataquit Ave., Bay Shore, N.Y. 11706

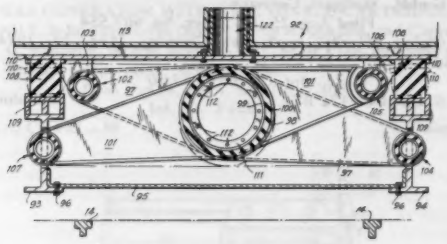
Filed June 12, 1975, Ser. No. 586,244

Int. Cl.² B61F *3/00*

U.S. Cl. 105—199 R **3 Claims**

1. A vehicle suspension system for use in conjunction with a railroad car, or the like, comprising, in combination: a truck assembly having side frames disposed longitudinally with respect to a car body supported thereby, said car body being pivotally supported by the truck assembly, and resilient means cooperative with the truck assembly for preserving substantially uniform parallelism as between the car body and the riding surfaces upon which the truck assembly is carried, said resilient means comprising a crossed lever assembly interconnecting sprung and unsprung elements of said car whereby parallelism of these elements is operatively preserved throughout the load range of the suspension system, said crossed lever assembly comprising a hollow hub assembly integral with crossed levers, the hollow hub assembly including concentrically disposed component hubs located at a common intersec-

ton of the crossed levers, radially adjacent surfaces of said hubs being bondedly interconnected by an elastomeric collar, said elastomeric collar being operationally stressed in torsional shear in resistance to load deflection of outwardly



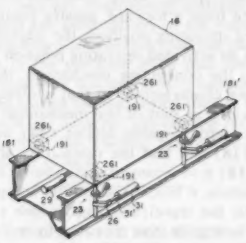
extending ends of said levers, the upwardly extending ends hingedly supporting said sprung elements, downwardly extending ends of said levers being supported by sid unsprung elements.

4,013,017

REMOTE RAILWAY CONTAINER LOCKING SYSTEM

Hiroshi Toyota, Tokyo; Toshio Yamazaki, Omiya, and Takashi Iketani, Yono, all of Japan, assignors to Japanese National Railways, Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 562,037
Claims priority, application Japan, Apr. 10, 1974, 49-39911
Int. Cl.² B61D *17/00, 49/00;* **B65J** *1/22;* **H01R** *33/00*
U.S. Cl. 105—366 C **8 Claims**



1. A system for issuing instructional signals to individual cars of a train for causing actuation of a means of said individual car, said system comprising:

a plurality of instructional signal lines extending in an array parallel to each other through each car in a direction parallel to the direction of travel of the car, the number of said lines being at least as great as the number of cars in the train;

a plurality of feedback lines extending in an array parallel to each other through each car in a direction parallel to the direction of travel of the car, the number of lines being at least as great as the number of cars in the train;

two pluralities of terminals at each end of each car corresponding in number to the number of instructional signal lines and the number of feedback lines, respectively, and the terminals in each plurality corresponding in position to the positions of the respective lines in the respective arrays of lines, the one ends of the lines being connected to the terminals at one end of each car in positional correspondence with said lines, and the other ends of the lines in each car being connected to terminals offset by one from the terminals in positional correspondence with the respective lines and the other end of the line on one edge of each array extending across the array and being connected to the terminal in positional correspondence with the line on the other edge of the array, and connections between the terminals in adjacent cars;

instructional signal receiving relay means in each car coupled to the line on said one edge of each instructional signal line array, and an apparatus in each car coupled to said instructional signal receiving relay means for operation in response to energization of said instructional signal receiving relay means; and

order fulfilled signal transmitting relay means in each car coupled to said line on said one edge of each feedback line array and including relay actuating means operatively associated with said apparatus for being actuated upon completion of the operation of said apparatus;

whereby when an instructional signal is supplied to one of said instructional signal lines, the instructional signal receiving relay means in the car in which said instructional signal line is at said one edge of the array of instructional signal lines is energized to actuate the apparatus and upon completion of the operation of the apparatus the actuation of the order fulfilled signal transmitting relay means transmits an order fulfilled signal through the feedback line at said one edge of the array of feedback lines in said car.

5. A system as claimed in claim **1** further comprising at least one energizing line for energizing the apparatus, said energizing line extending through all of the cars in series, and further relay means in each car coupled to said energizing line, and a normally open contact of the instructional signal receiving relay means connected between the further relay means and the energizing line.

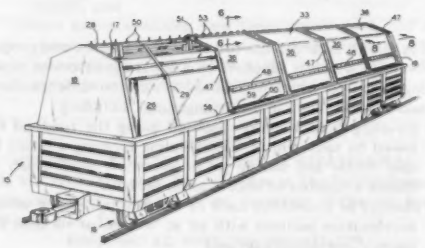
7. A system as claimed in claim **5** in which said apparatus comprises means for locking of containers to a railway car, including a plurality of container fastening bars which are raised to raise a locking head into a corresponding recess in a container and then turned to lock the head into the recess, there being at least one set of fastening bars on each car for each size container carried on the car, each car having a number of energizing lines and further relay means corresponding to the number of types of containers which can be carried on a car, and said further relay means being operatively associated with said means for locking of containers for raising the fastening bars.

4,013,018

PNEUMATIC SHIPPING ENCLOSURES

Ralph C. Hansen, Toledo, and Ray P. Miles, Macedonia, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Jan. 20, 1975, Ser. No. 542,461
Int. Cl.² B60P *7/04, 7/10, 7/16;* **B61D** *45/00*
U.S. Cl. 105—468 **4 Claims**



1. The combination: with a goods supporting structure including a goods supporting framework mounted on a vehicle; of a protective cover comprising two flexible sheets arranged in face to face relation and sealed together in selected areas to form substantially flat sealed marginal portions, upper and lower inflatable compartments within said marginal portions and between said sheets, an elongated sealed area sepa-

rating said compartments and about which sealed separating area said compartments can be swung into and out of angular relationship with one another, means for securing the upper of said marginal portions of said cover to said framework to permit said compartments to be swung into angular relationship and to extend over and into covering relationship to goods supported on said framework, and means for securing the lower of said marginal portions of said cover to one side of said vehicle; and a similar cover with means for securing its upper marginal portion to said framework in overlapping relation to the upper marginal portion of said first mentioned cover and for securing its lower marginal portion to said vehicle at the opposite side thereof from said first mentioned cover.

4,013,019

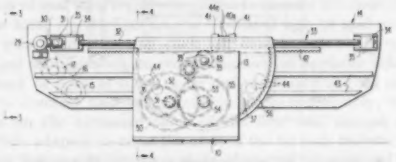
DRIVE FOR TILTABLE X-RAY TABLE

William Charles Horsey, Towson, Md., assignor to CGR Medical Corporation, Baltimore, Md.

Filed Nov. 25, 1975, Ser. No. 635,049

Int. Cl.² A47F *5/12*

U.S. Cl. 108—5 **11 Claims**



1. An X-ray examination table comprising a relatively stationary pedestal and a movable patient supporting table body having a rotational axis, means supporting the table body on said pedestal and allowing the table body to move translationally and rotationally relative thereto, a primary power drive means connected with the table body to produce translational movement thereof, and a variable ratio gear train connected with the table body to move it with increasing angular velocity around said rotational axis of the table body during said translational movement of the table body by said primary power drive means, said table body carrying a driver means for said variable ratio gear train to power the gear train during said translational movement of the table body, said variable ratio gear train including a pair of engaging elliptical gears, and said elliptical gears having their major elliptical axes coinciding when the table body is in a level attitude, whereby rotational movement of the table body toward an upright attitude increases from a minimum angular velocity to a maximum angular velocity by operation of said gear train during said translational movement of the table body.

4,013,020

FLEXURE-COMPENSATING DEVICE FOR FLEXIBLE PALLETS SUPPORTING VERY HEAVY LOADS

Alexander Schoeller, deceased, late of Munich-Solln, Germany, and by Christina von Podewils-Schoeller, heiress, CH-7524 Zuoz, Switzerland

Continuation-in-part of Ser. No. 265,195, June 22, 1972, abandoned. This application Apr. 23, 1974, Ser. No. 463,261

Int. Cl.² B65D *19/44*

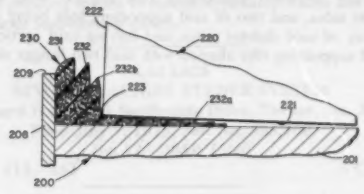
U.S. Cl. 108—51.1 **1 Claim**

1. A flexure compensating device for a flexible pallet supporting a very heavy load and having a load-supporting surface with marginal zones thereon, comprising projections providing both vertical compensation for downward deformation of said pallet and lateral resistance to sidewise movement of said heavy load, said projections being:

A. disposed along said marginal zones and tending to cause tilting of said load toward the center of said pallet in absence of said downward deformation and substantially vertical alignment in presence of said downward deformation of said pallet; and

B. in the form of a plurality of sidewardly disposed ledges and edge-adjoined ramps which:

1. incline inwardly and downwardly to meet said load-supporting surface; and



2. are parallel and adjoining in each of said marginal zones,

said ramps having a sufficiently steep slope that each of said ramps can engage an outward edge of said very heavy load and offer lateral resistance to sidewise sliding of said load, at least partially by forcing said outward edge to move uphill during said downward deformation.

4,013,021

PLASTICS MATERIAL PALLET

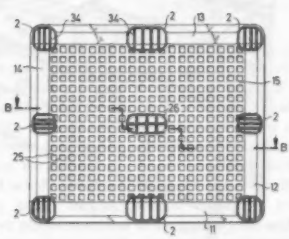
Rudolf Steinlein, Almbachstrasse 8, 8 Munich 25, Germany; Alexander Schoeller, deceased, late of Munich-Solln, Germany, and by Christina Schoeller, administratrix, Chesa Balaster, 7524 Zuoz (Engadin), Switzerland

Filed Jan. 20, 1975, Ser. No. 542,238

Claims priority, application Germany, Jan. 24, 1974, 2403374

Int. Cl.² B65D *19/32*

U.S. Cl. 108—51.1 **9 Claims**



1. A pallet made of plastics materials and comprising:

A. a load-bearing rigid frame having two longer sides, two shorter sides, and four corners;

B. a rigid deck insert which is fitted into and attached to said rigid frame;

C. a central supporting leg which is attached to said rigid deck insert at the center thereof; and

D. eight supporting legs which are attached to the four corners of said rigid frame and to the four sides thereof, midway between two of said corners, each of said eight supporting legs comprising:

1. a smoothly curved outer surface which is vertically disposed,

2. a horizontally disposed supporting rib which is disposed within and rigidly attached to said smoothly curved outer surface,

3. a plurality of vertically disposed supporting ribs which are disposed within and rigidly attached to said smoothly curved outer surface and to said horizontally disposed supporting rib, and

4. said smoothly curved outer surfaces and said vertically disposed supporting ribs attached to said rigid frame in a manner to provide a smooth connection therebetween,

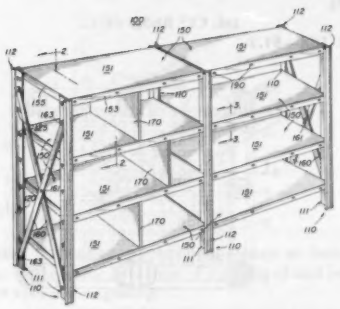
four of said eight supporting legs being disposed at said four corners and having said vertically disposed supporting ribs aligned with said two shorter sides, two of said supporting legs being disposed midway of said longer sides and having said vertically disposed supporting ribs aligned with said two shorter sides, and two of said supporting legs being disposed midway of said shorter sides and having said vertically disposed supporting ribs aligned with said two longer sides.

4,013,022

SHELVING APPARATUS

Florian A. Walter, and Edward C. Stewart, both of Aurora, Ill., assignors to Lyon Metal Products Incorporated, Aurora, Ill.

Filed Dec. 2, 1971, Ser. No. 203,973
Int. Cl. A47 *29/02*
U.S. Cl. 108—114 **22 Claims**



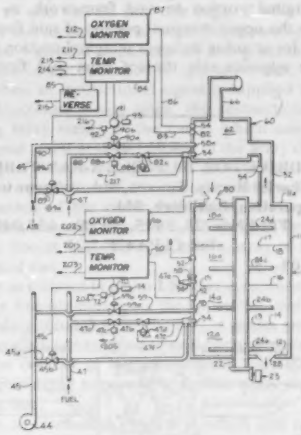
1. Shelving structure comprising a pair of upstanding spaced-apart support posts, each of said support posts including two generally rectangular interconnected parallel plates disposed in back-to-back relationship, one of said rectangular plates extending transversely a predetermined distance beyond the adjacent side edge of the other of said rectangular plates and cooperating therewith to define an attachment recess, said support posts being disposed in use with the rectangular plates of one post being respectively substantially coplanar with the rectangular plates of the other of said posts, a closure panel extending between said posts with the opposite ends of said panel respectively disposed in said attachment recesses in overlapping parallel relationship with said one rectangular plate and in edge-to-edge abutting relationship with said other of said rectanglar plates thereby to facilitate attachement of said panel to said support posts, and a shelf mounted on said support posts.

4,013,023

INCINERATION METHOD AND SYSTEM

Luis A. Lombana, and Jose G. Campos, both of Belmont, Calif., assignors to Envirotech Corporation, Menlo Park, Calif.

Filed Dec. 29, 1975, Ser. No. 645,063
Int. Cl.² F23G *5/12*
U.S. Cl. 110—8 A **23 Claims**



1. A method of incinerating partially dewatered sewage sludge containing organic wastes in a multiple hearth furnace equipped with an afterburner connected to receive gases and vapors from the furnace, said method comprising the following steps:

a. introducing the wastes into the multiple hearth furnace and moving the same downwardly therethrough by rabbling;

b. pyrolyzing the wastes in the furnace in an oxygen deficient atmosphere and regulating that atmosphere to only partially complete the oxidation of substances which are pyrolyzed from the wastes;

c. conveying the partially oxidized products of pyrolysis in the medium of gases and vapors from the furnace to the afterburner; and

d. introducing sufficient air into the afterburner to complete the oxidation of the partially oxidized substances carried by the gases and vapors from the furnace.

13. A system for incinerating partially dewatered sewage sludge containing organic wastes comprising:

a. a multiple hearth furnace inclusive of means for admitting the wastes into said furnace and means for moving the wastes downwardly through said furnace by rabbling;

b. first burner means connected in communication with said furnace for introducing air and fuel thereinto for pyrolyzing the wastes;

c. means connected to said first burner means to control the action thereof so that atmosphere within said furnace is deficient in oxygen and the organic substances which are pyrolyzed from the organic wastes are only partially oxidized;

d. an afterburner connected to said furnace to receive the partially oxidized products of pyrolysis in the medium of gases and vapors from said furnace;

e. second burner means connected in communication with said afterburner for introducing air and fuel thereinto for combustion; and

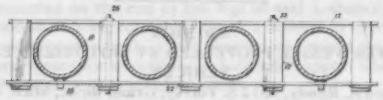
f. afterburner control means connected to said second burner means to control the introduction of air and fuel into said afterburner to complete the oxidation of the partially oxidized substances carried by the gases and vapors from the furnace.

4,013,024

SLOTTED BAND TYPE SPACER FOR HIGH TEMPERATURE SUPERHEATER TUBES

Edward L. Kochey, Jr., Colebrook, and Edward A. Hatch, Granby, both of Conn., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Jan. 7, 1976, Ser. No. 647,036
Int. Cl.² F23M 9/10; F22B 37/24
U.S. Cl. 110—98 R **1 Claim**



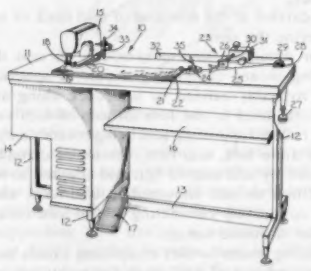
1. A band type spacer adapted to maintain a predetermined distance between spaced tubes, a housing, a bank of essentially parallel tubes in said housing, a first elongate strip member adjacent one side of said tube bank having spaced tabs formed uniformly at one side thereof and adapted to (that) extend laterally between tubes, a second strip member normal to said tabs confronting the opposite side of said tube bank and having a plurality of slots therein parallel to the longitudinal axis of said strip members spaced to receive the ends of the lateral tabs, a weldment on the outboard side of said second strip member connecting each tab thereto, openings in the first and second elongate strip members on opposite sides of the bank of parallel tubes, a tie rod traversing aligned openings to connect said strips into an integral assembly, weldments on the outboard sides of the first and second strip members adapted to bond the ends of the tie rods thereto, and support legs bonded to the surface of spaced tubes in said tube bank adapted to provide a support surface subjacent one of the lateral strips for the spacer assembly.

4,013,025

FABRIC TENSIONING DEVICE FOR SEWING AND ASSEMBLY UNITS

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed Oct. 9, 1975, Ser. No. 621,217
Claims priority, application Italy, Feb. 27, 1975, 20684/75
Int. Cl.² D05B 21/00
U.S. Cl. 112—121.15 **5 Claims**



1. A workpiece gripping device for a sewing and assembly unit for holding and tensioning pieces of cloth being advanced on the unit's work surface while forming pants and the like in which the sewing and assembly unit includes the usual sewing and advancement elements, said gripping device comprising:

a. a gripping means defining a sliding block (36) supported for unrestricted directional movement on the work surface having a pivotal jaw member for holding the ends of the pieces of cloth most remote from the sewing and advancing elements;

b. control means operatively connected to said jaw member for moving the latter between positions for gripping and releasing the cloth;

c. retaining means connected to said gripping means having a biasing means for applying a braking force to said gripping means and maintaining tension on the cloth as it is moved along the work surface; and

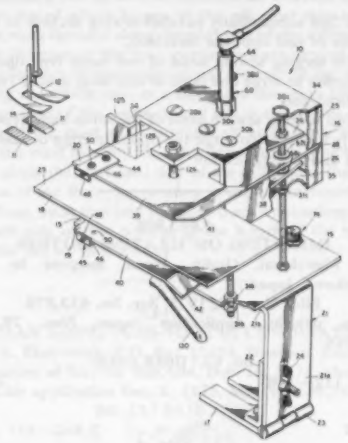
d. actuating means carried on the work surface for engaging said control means to effect movement of said jaw member to that position for releasing the cloth and returning said gripping means to its initial position under the influence of said biasing means.

4,013,026

SEWING MACHINE FEEDER SYSTEM

W. Richard Hall, 4261 Smithsonia Drive, Tucker, Ga. 30084

Filed July 7, 1975, Ser. No. 593,700
Int. Cl.² D05B 35/10
U.S. Cl. 112—153 **6 Claims**



1. In combination, a sewing machine including a reciprocatable needle or the like to connect together plies of material and a material feeding means for pulling plies of material along a path through the needle, and a material guide means positioned on the infeed side of the reciprocatable needle of the sewing machine comprising a stationary guide means, first clamping means for urging the lower ply of material to be pulled into and sewn by the sewing machine upwardly against said stationary guide means, second clamping means for urging the upper ply of material to be pulled into and sewn by the sewing machine downwardly against said stationary guide means, first fluid powered ram means arranged to urge said first clamping means toward said stationary guide means and against the lower ply of material and second fluid powered ram means arranged to urge said second clamping means toward said stationary guide means and against the upper ply of material, and means for supplying pressurized fluid at varying pressures to said first and second ram means to vary the forces with which said first and second clamping means are urged against said stationary guide means.

4,013,027

DUAL SEWING HEAD SERGING MACHINE

David R. Cash, Louisville, Ky., assignor to James Cash Machine Co., Louisville, Ky.

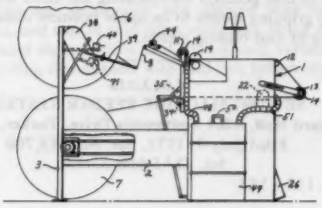
Filed Apr. 1, 1976, Ser. No. 672,668
Int. Cl.² D05B 25/00
U.S. Cl. 112—155 **3 Claims**

1. A dual sewing head serging machine for serging the opposite edges of an elongate strip employed in the manufacture of mattresses and other products, comprising:

A. a turn member;

B. means for directing the strip in one direction along a **1st** run of a given path extending to one side of said turn member and withdrawing it from the opposite side thereof along a **2nd** run of said given path extending in the opposite direction, said path having

1. a 1st sewing section in the **1st** run of said one direction, and



2. a 2nd substantially parallel sewing section in the **2nd** run of said opposite direction;

C. a 1st serging sewing head of one hand type operatively mounted to serge one edge of said strip in said **1st** sewing section; and

D. a 2nd serging sewing hand of the same hand type operatively mounted to serge the opposite edge of said strip in said **2nd** sewing section.

4,013,028

IMPARTING OSCILLATING MOTION

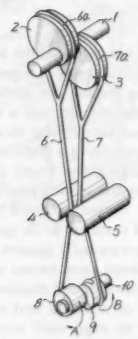
Saburo Murakami, Osaka, Japan, assignor to Wataru Shimokawa, Japan

Filed Nov. 20, 1975, Ser. No. 633,878

Claims priority, application Japan, Nov. 29, 1974, 49-136318

Int. Cl.² D05B *69/00*

U.S. Cl. 112—220 **4 Claims**



1. Apparatus, for imparting an oscillating motion to a driven shaft from a drive shaft rotating continuously in one direction, comprising:

i. first and second cranks mounted on said drive shaft at 180° opposed positions

ii. first and second inextensible links each having a first end and a second end and a flexible portion, said first link being coupled at its first end to said first crank, said second link being coupled at its first end to said second crank

iii. first and second winding bodies mounted on said driven shaft, the second end of the first link being secured to said first winding body and being wound round said first winding body in one direction about the axis of rotation of the driven shaft for a length greater than the throw of said first crank, the second end of the second link being secured to said second winding body and being wound round said second winding body in the opposite direction about the axis of rotation of the driven shaft for a length greater than the throw of said second crank

iv. guide means disposed between said cranks and said wrapping bodies, said guide means having opposed spaced surfaces defining an opening in which said flexible portion of each link is positioned such that both links move through said opening.

4,013,029

WATER VESSEL PROPELLED BY MOTORIZED LAND VEHICLE

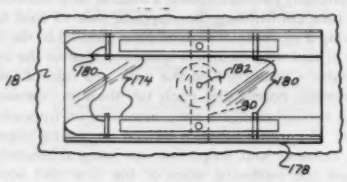
Howard A. Rhody, 9312 S. Torrey, Grand Blanc, Mich. 48439

Division of Ser. No. 174,057, Aug. 23, 1971, Pat. No. 3,826,216. This application May 23, 1974, Ser. No. 472,591

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976

Int. Cl.² B60F *3/00*

U.S. Cl. 114—255 **1 Claim**



1. A water vessel adapted to be propelled by a snowmobile, said water vessel comprising:

a snowmobile having a frame supported by a pair of transversely spaced skis and a rotatably mounted endless drive belt, said drive belt being driven by power generating means of said snowmobile, said skis being operable for rotational movement about a vertical axis to steer said snowmobile;

a pair of pontoons of a length exceeding the length of said snowmobile;

a deck extending the full length of said pontoons, said deck having a forward end and a rear end;

means connecting said deck to said pontoons to maintain said pontoons in a spaced, parallel relationship;

a propeller rotatably carried by said vessel at the rear end of said deck;

a rudder carried at the rear end of said deck of said vessel for steering the same;

means for mounting said snowmobile on said deck, said mounting means comprising a pair of spaced, parallel rollers rotatably carried by said deck along axes transversely disposed to the fore-aft axis of said vessel; said pair of rollers supporting and being rotatable by a second endless drive belt, said first mentioned drive belt being supported by said second belt and adapted to rotate said second belt as said snowmobile is driven; and linkage means operatively connecting one of said rollers to said propeller to rotate same;

said mounting means further comprising a plate mounted on the forward end of said deck for rotational movement about a vertical axis with respect to both said deck and said pontoons, said skis of said snowmobile being received on said plate and releasably held thereon; and means connecting said rotating plate to said rudder whereby said rudder is rotated in response to the rotational movement of the plate as said snowmobile skis are rotated;

means connecting said snowmobile skis to said plate for preventing both lateral and forward movement of said snowmobile with respect to said deck;

the endless drive belt of the snowmobile being of a greater length than the second endless drive belt rotating the pair

of rollers causing the endless drive belt to overhang the rollers for an even distribution of weight;

the endless drive belt of the snowmobile and the second drive belt rotating the rollers being arranged tautly between their respective carrying wheels and rollers; and

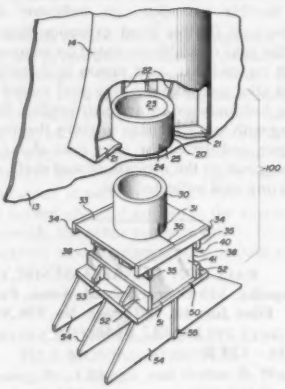
a shaft adapted for rotational movement about an axis transversely disposed with respect to the fore-aft axis of said water vessel, the outer end of said shaft being of an L-shaped configuration and extending beyond the outer contour of said pontoons, said support wheels being mounted on the end of the legs of said L-shaped shaft, said shaft being rotatable in such a manner as to position said support wheels in said lowered and raised positions, and means for selectively locking said support wheels in the raised and lowered positions.

4,013,030

SUPPORT FOR LNG SHIP TANKS

Donald Claude Stafford, Hinsdale, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Feb. 26, 1976, Ser. No. 661,776
Int. Cl.² B63B 25/16
U.S. Cl. 114—74 A **14 Claims**



13. In a ship having a spherical tank having a support system located about the equator section of the tank,

the support system comprising a plurality of essentially identical composite supporting units spaced around the circular horizontal section, with each said supporting unit being joined to the tank and to a base,

each supporting unit having a vertical key with radial contact faces located between and in slidable contact with a pair of opposing vertical faces of a keyway,

each supporting unit having a vertical coupling comprising a sleeve joined stationary to the tank and with a cylindrical element located rotatably in the sleeve about a vertical axis during assembly of the support system, and with the bottom face of each sleeve machined flat to be in about the same horizontal plane,

the vertical key being joined to the cylindrical element and the vertical keyway being joined to the base; and

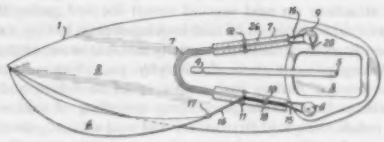
with a marking for the coincident radius of the sleeve and the tank, and a marking on the radius of the cylindrical element parallel to the keyway and the key, in alignment with each other.

4,013,031

APPARATUS TO CONTROL JIB

Anthony V. L. Viviano, 141 Athol Ave., Oakland, Calif. 94606

Filed Mar. 4, 1976, Ser. No. 663,930
Int. Cl.² B63H 9/10
U.S. Cl. 114—204 **4 Claims**



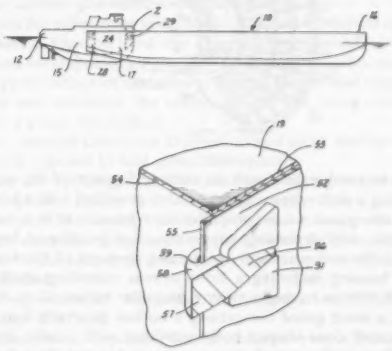
1. A linearly, internally sectioned, slotted traveller-track apparatus with linear, horizontal, perforated extrusions, affixed to a sailboat, such that when viewed from above, said traveller-track can be seen to describe an inverted U-shaped arc, one leg of which begins in the aft, port side area of a sailboat, runs forward along the port side of the sailboat in the general direction of the bow, curves forward around the port side of the mast of said sailboat and forward of the mast in a sweeping arc which runs in a starboard direction toward the starboard side of the sailboat, and which then turns aft from forward of the mast and continues aft around the starboard side of the mast forming the other leg of the U which continues aft along the starboard side of the sailboat in the general direction of the stern, terminating in the aft starboard area of the sailboat, such that said traveller-track's extrusions parallel only each side of that portion of the length of the traveller-track that lies aft of the mast.

4,013,032

OCEAN GOING PUSH-TOWING COMBINATION

Robert A. Bludworth, P.O. Box 12424, Houston, Tex. 77017

Continuation of Ser. No. 208,604, Dec. 16, 1971, abandoned. This application Dec. 8, 1975, Ser. No. 638,542
Int. Cl.² B63B 21/00
U.S. Cl. 114—248 R **7 Claims**



1. A marine transportation combination comprising a first vessel having a bow and sides and a second vessel having a notch at one end for receiving at least a portion of said first vessel, said notch having a pair of oppositely disposed wings and being open at the top and bottom, at least a portion of said first vessel being receivable in said notch between said wings, at least three individual locking means for rigidly coupling said first vessel to said second vessel, each of said locking means providing substantially point interengagement of said first and second vessels, one of said locking means comprising struc-

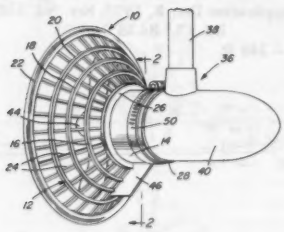
ture on one side of said first vessel interengageable with structure on the wing of said notch adjacent said one side of said first vessel, a second of said locking means comprising structure on the other side of said first vessel interengagable with structure on the other wing of said notch adjacent said other side of said first vessel, a third of said locking means comprising structure on the bow of said first vessel, interengagable with structure on said second vessel located generally centrally of said notch, all of said locking means having a conformation so as to permit substantially instantaneous engagement or disengagement thereof, thereby providing substantially instantaneous mating and unmating of said first and secnd vessels, and means for preventing spreading of said wings of said notch once said first vessel and said second vessel are in the mated position, said means for preventing spreading comprising a first structural formation on said one side of said first vessel, a second structural formation on said other side of said first vessel, a third structural formation on one of said wings closely adjacent the stern portion thereof and a fourth structural formation on the other of said wings closely adjacent the stern portion thereof, said first and second structural formations engaging said third and fourth structural formations, respectively, when said locking means interengage and said first and second vessels are mated, said structural formations being disengagable by relative movement of said first and second vessels away from one another, said structural formations being rigid and preventing any substantial lateral outward movement of said wings when said first and second vessels are mated.

4,013,033

WEED GUARD FOR TROLLING MOTORS

Stephen G. Porter, and Theodore J. Adams, both of 249 NE. 32nd St., Fort Lauderdale, Fla. 33334

Filed Jan. 28, 1976, Ser. No. 653,272
Int. Cl.² B63H *5/16*
U.S. Cl. 115—42 **10 Claims**



1. In combination with an outboard motor of the type including a depending support portion provided with a horizontally elongated marine propeller drive housing at its lower end portion, said depending support portion positioned between forwardly and rearwardly projecting portions of the housing, said housing including a front to rear extending shaft journaled therein having a marine propeller mounted on its rear end, a weed guard comprising a hollow generally horizontal truncated cone-shaped body provided with axially and circumferentially spaced water passages formed therethrough, said body being constructed of light weight, stiff but somewhat flexible material, the minor diameter end of said body including an integral endwise outwardly projecting cylindrical extension snugly telescoped over the rearwardly projecting portion of said housing closely forward of said propeller and with said cone-shaped body disposed entirely rearward of said depending support portion, and clamp means clamping said extension about said housing with the center axis of said body at least generally coinciding with the center axis of said housing and the major diameter end of said body loosely enclosing said marine propeller, the slant height angle of the body relative to its center axis being between 35° and 60°.

4,013,034

STEERING CONTROL DEVICE

George A. Cantley, Akron, and John E. Litzell, Hudson, both of Ohio, assignors to Incom International Inc., Pittsburgh, Pa.

Filed Mar. 10, 1975, Ser. No. 556,687
Int. Cl.² B60Q *1/42*; **B63H** *25/36*
U.S. Cl. 116—31 **10 Claims**

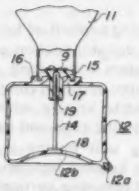
1. A steering control device comprising a shaft connected to a steering wheel and connected at a remote end to turning means for operative attachment to a steering system, said shaft rotatably mounted on a housing a pinion gear means mounted on said shaft to rotate therewith, said housing including adjacent the steering wheel a hub member, with a hole therethrough for rotatable passage of said shaft, the hub member having a flexible extension, an indicator disc rotatably mounted on said flexible axial extension coaxial with said shaft, an idler gear rotatably mounted on an extension parallel to the shaft on said disc, said pinion gear meshing with and driving said idler gear about a ring gear means connected to the housing hub outward of and surrounding the pinion gear and meshing with said idler gear whereby the pinion gear turns the idler gear and drives the idler gear about the ring gear means in response to the rotation of said shaft, said idler gear thereby driving said indicator disc.

4,013,035

BALLOON SIGNAL ASSEMBLY

Saul Z. Kopeika, 310 Concord Road, Aston, Pa. 19014

Filed July 18, 1975, Ser. No. 596,987
Int. Cl.² B64B *1/52*
U.S. Cl. 116—124 B **13 Claims**



1. A signal assembly comprising:

a. an inflatable means capable of retaining a lighter-than-air gas,

b. a container of said gas under pressure, said container being connected to said inflatable means and including a manually yieldable and resilient wall portion,

c. seal means connected to said container for preventing release of said gas from said container into said inflatable means, and

d. means in proximity to said wall portion and to said seal for breaking said seal upon inward manual pressure on

said wall portion whereby gas flows into said inflatable means through said broken seal, said (d) means including a pointed rigid portion which is brought into piercing contact with said seal means when said inward pressure is exerted upon said wall portion and said wall portion withdraws said pointed portion from contact with said seal means when no inward pressure is exerted on said wall portion.

4,013,036

TIME SWITCH DEVICE FOR X-RAY DIAGNOSTIC APPARATUS

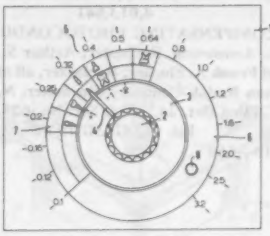
Ulrich Grassmé, Nuremberg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 13, 1975, Ser. No. 631,612

Claims priority, application Germany, Dec. 23, 1974, 2461263

Int. Cl.² G09F 9/00

U.S. Cl. 116—129 T **6 Claims**



1. In a time switch device for X-ray diagnostic apparatus, particularly for the preparation of tooth exposures; including a knob for the setting of the exposure periods; and a scale carrier having a time scale thereon being associated with said knob, the improvement comprising: a symbol carrier being associated with said knob and being displaceable in the setting direction of said knob relative to said knob and to said time scale; and symbols of the objects to be X-rayed being provided on said symbol carrier at such a spacing relative to each other whereby, upon setting one said symbol to the exposure period associated therewith, the other symbols will be located opposite their respectively associated exposure periods on the time scale.

4,013,037

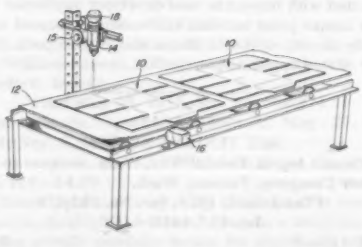
APPARATUS FOR CONTROLLABLY APPLYING LIQUIDS TO A MOVING SURFACE

Walter B. Warning, Sr., Chicago, and Walter B. Warning, Jr., Schaumburg, both of Ill., assignors to Airprint Systems, Inc., Elk Grove Village, Ill.

Filed Mar. 27, 1975, Ser. No. 562,679

Int. Cl.² B05C 5/00, 11/10

U.S. Cl. 118—2 **4 Claims**



1. Apparatus for applying a liquid in a predetermined pattern to a traveling surface, comprising

a spray head having a liquid spray orifice,

means mounting said head so that said surface travels past said orifice and is sprayed with liquid exiting said head through said orifice,

a pulse generator for producing an electric pulse for each predetermined increment of movement of said surface,

means responsive to the rate of said pulses for providing an electric signal having a voltage proportional to the rate of said pulses,

a needle valve reciprocably mounted in said head for movement between a forward position closing said orifice and an adjustable rearward position wherein said needle is at least partially withdrawn from said orifice,

a motor means mounted to said head and having a rotor for adjusting said rearward position in proportion to said electric signal,

means responsive to a first number of said pulses for moving said needle valve into said rearward position, and means responsive to a second and subsequent number of said pulses for returning said needle valve to said forward position.

4,013,038

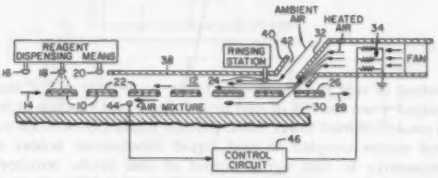
APPARATUS FOR CONTROLLING THE TEMPERATURE OF A LIQUID BODY

Charles H. Rogers; Kevin J. Sullivan, and Miles E. Vance, all of Raleigh, N.C., assignors to Corning Glass Works, Corning, N.Y.

Filed July 21, 1975, Ser. No. 597,323

Int. Cl.² B05C 5/00

U.S. Cl. 118—5 **16 Claims**



1. An apparatus for staining a biological specimen disposed on the surface of a microscope slide comprising

means for supporting said slide so that said biological specimen is disposed upon the upper surface thereof,

means for dispensing a plurality of staining reagents on said upper surface of said slide to form a film of said reagents on said specimen, the surface of said film being exposed to a given atmosphere,

a dry thermal conductor exposed to said given atmosphere,

a wick exposed to said given atmosphere,

means for applying to said wick a liquid having evaporative properties similar to those of said reagent film,

a temperature sensing element in thermal contact with said dry thermal conductor and said wet wick for providing an electrical output determined by the temperature of said element,

heating means for increasing the temperature of said reagent film, and

control means responsive to the electrical output from said temperature sensing element for controlling the heat energy output of said heating means.

4,013,039

WET PROCESSING PH CONTROL

Fabian Kubilius, Poughkeepsie; Gary Frank Pavlovic, Beacon, and Jerome Woolf, Newburgh, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

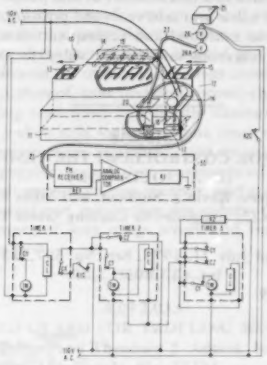
Filed Sept. 2, 1976, Ser. No. 719,777

Int. Cl.² B05C 11/10

U.S. Cl. 118—7 **9 Claims**

1. A wet processing station in which control of the PH of the

processor liquid is mandatory within predetermined limits, said processor comprising: a tank having means to subject product to a bath of processing liquid; a PH monitoring probe in said tank; a pump in said tank for mixing processing liquid therein, said pump having a processing liquid intake and a discharge, said intake being positioned closely adjacent said probe so that liquid being mixed in said tank by said pump will flow across said probe; a liquid concentrate holder for holding a liquid concentrate capable of increasing the PH of the processing liquid, and liquid carrying means connecting said holder to said probe, said liquid carrying means having an outlet positioned to discharge said liquid concentrate directly onto said probe; probe monitoring means responsive to the



output of said PH monitoring probe to provide a first signal output when the PH of said processing liquid reaches at least a predetermined lower limit; process liquid concentrate control means coupled to said liquid concentrate holder and responsive to said signal output of said probe monitoring means to apply a predetermined dose of said liquid concentrate to said probe; timer means to interrupt the first signal output of said probe monitoring means for a predetermined period of time upon said dose of liquid concentrate being applied to said probe to insure mixing of the processing liquid within said tank prior to said probe monitoring means being effective to add another dose of liquid concentrate to said tank.

4,013,040

APPARATUS FOR EPITAXIALLY GROWING A LAMINATE SEMICONDUCTOR LAYER IN LIQUID PHASE

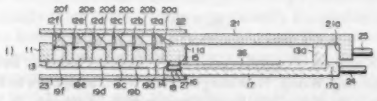
Yoshiji Horikoshi, Tokyo, Japan, assignor to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Dec. 11, 1975, Ser. No. 639,713

Claims priority, application Japan, Dec. 20, 1974, 49-145599

Int. Cl.² B05C *3/09*

U.S. Cl. 118—415 **8 Claims**



1. An apparatus for epitaxially growing a laminate semiconductor layer in liquid phase, which comprises a substrate holder bored with a depression; a solution receptacle-holding plate closely mounted on the substrate holder so as to slide thereon and provided with a solution receptacle having an inlet port and outlet port and being open at the bottom; a solution tank holder closely mounted on the solution receptacle-holding plate and providing with a plurality of solution tanks, each being open at the top and bottom for communication with the inlet port of the solution receptacle; and pressurizing means for causing the solution of each solution tank to flow into the solution receptacle, wherein the solution receptacle-holding plate and substrate holder are made to slide relative to each other to bring the solution of each solution tank, solution receptacle and substrate depression into alignment through the inlet port of the solution receptacle; and the solution of the solution tank is forced by the pressurizing means into the solution receptacle and substrate depression so as to expel the unnecessary portion of the preceding solution already retained in the solution receptacle and substrate depression for interchange between the preceding and succeeding solutions.

4,013,041

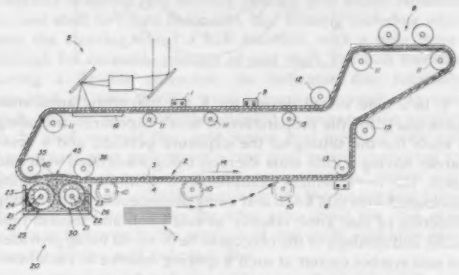
SELF-COMPENSATING PHOTOCONDUCTOR WEB

Timothy G. Armstrong, Rochester; Arthur S. Kroll, Spencerport, and Frank A. Shuster, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,427

Int. Cl.² G03G *15/08*

U.S. Cl. 118—656 **8 Claims**



1. In electrographic apparatus of the type including a flexible web having an imaging side, a developer applicator, including at least one generally cylindrical member, and drive and guide means for controlling movement of said web around an endless path past said applicator, the improvement wherein:

said drive and guide means are constructed and located along said endless path in a manner such that said web is in a non-tensioned condition during its passage over said applicator; and

a portion of said guide means includes rotatable guide rollers spaced apart, in a direction generally parallel to said path, a distance which is between about 1.38 and 2 times the sum of the radii of said developer applicator members plus any spacing between said applicator members and located with respect to said developer applicator so that the center point between said rollers is located substantially directly opposite, across said endless path, the center of said applicator.

4,013,042

NET TENDING SYSTEM

Lester Donald Ingold, Federal Way, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed June 2, 1975, Ser. No. 583,078

Int. Cl.² A01K *63/00*

U.S. Cl. 119—3 **9 Claims**

1. A means for defining a fixed volume of water in which marine life is confined within a larger volume and below the surface of said water, comprising:

a flexible enclosure means suitable for the care and propagation of marine life including side walls and a bottom wall formed from flexible porous materials allowing said water to pass through said walls;

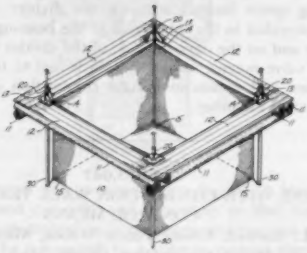
a plurality of supporting members extending vertically above and below said water surface,

said supporting members being spaced horizontally from one another to expand and fixedly support the flexible enclosure means to substantially its maximum volume;

upper connector means extending from the upper portion of said supporting members to the uppermost portion of said enclosure side walls to position the uppermost portion of said enclosure above surface;

lower connector means extending from the lower portion of said supporting members to the lowermost portion of said enclosure to position the bottom wall a distance below said surface and to define the maximum volume of said enclosure; and

a supporting frame, above and adjacent to said water surface, to which the supporting members are adjustably attached wherein said supporting frame supports the



weight of the volume defining means and permits adjustments of its volume.

7. A method of transfering marine life from a first enclosure, attached to a supporting frame which supports said first enclosure so that the uppermost portion of the enclosure is just sufficiently above a water surface to contain said marine life, to a second enclosure without the loss of said marine life to the water outside of said enclosure, comprising the steps of:

reducing the volume beneath the water surface within said first enclosure by raising said first enclosure while the marine life remains in the reduced volume defined by the enclosure below said surface;

positioning said second enclosure beneath the raised first enclosure with the uppermost boundaries of said second enclosure located above said water surface and attached to said supporting frame; nd

lowering a portion of the uppermost boundaries of the first enclosure below said water surface but within the uppermost boundaries of said second enclosure thereby permitting said marine life to flow out of said enclosure into said second enclosure.

4,013,043

MILKING APPARATUS

Patrick William Kirwan, Kilnagrange, Kilmacthomas, County Waterford, Ireland

Filed May 27, 1975, Ser. No. 580,811

Claims priority, application Ireland, May 27, 1974, 1119/74; Nov. 8, 1974, 2298/74

Int. Cl.[2] A01J *5/04*

U.S. Cl. 119—14.09 **6 Claims**

1. Milking apparatus comprising a milk line for conveying milk from a plurality of teat-cup clusters to a receiving vessel, comprising a milk conduit, means for separately attaching each of a plurality of teat-cup clusters to said conduit at spaced points along said conduit for flow of milk in one direction through said conduit, a water-jacket surrounding said conduit, means to introduce relatively cold water into said jacket for flow of water through said jacket in a direction opposite to said one direction, means for withdrawing from said water-jacket relatively warm water heated by the milk in

the milk conduit, a dropper line connected to each of a plurality of said connecting means for connecting a said connecting means to a teat-cup cluster, and a water-jacket about each said dropper line.

4,013,044

REARING UNITS

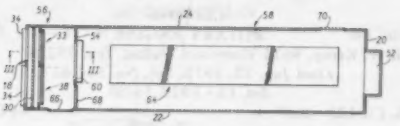
John Charles Michael Shaw, Saltfleetby-St-Peter, England, assignor to Spotmanor Limited, Lincolnshire, England

Filed Feb. 26, 1975, Ser. No. 553,190

Claims priority, application United Kingdom, Feb. 28, 1974, 09207/74

Int. Cl.[2] A01K *1/00*

U.S. Cl. 119—16 **16 Claims**



1. A rearing unit for farm animals comprising a substantially rectangular body having a pair of spaced side walls, bottom and top walls extending between said side walls and a pair of end walls extending between said side, bottom and top walls at opposite ends thereof and having at least one cage mounted therein for containing said animals, power-operated air exhaust means mounted in one of said end walls for withdrawing air from the unit and air inlet means provided at the opposite of said end walls through which air may be drawn into said unit by said power-operated air exhaust means, said at least one cage being located in said unit between said air inlet means and said one end wall and said air inlet means including a first panel spaced interiorly from said opposite end wall isolating the space therebetween and a second panel spaced interiorly from said first panel isolating the space therebetween, said end wall, first panel and second panel each having an aperture therein, said apertures being arranged out of horizontal alignment to provide a substantially U-shaped path through said inlet means to restrict the flow of air therethrough into said at least one cage and control the volume of air withdrawn from said unit by said power-operated air exhaust means.

4,013,045

TWIN FURNACE INDUSTRIAL BOILER

William Hunter Pollock, East Granby, Conn., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

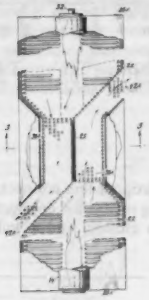
Filed Apr. 28, 1976, Ser. No. 680,839

Int. Cl.[2] F22B *31/04*

U.S. Cl. 122—240 R **6 Claims**

1. A shop assembled boiler comprising an upper drum that extends horizontally to form a ridge along the apex of an

A-type boiler, a pair of lower drums positioned under the upper drum and spaced apart to comprise a base for said boiler, a plurality of tubular members connecting the lower drums with the upper drum to provide side walls enclosing a furnace cavity having a hopper bottom on opposite sides of an elongate throat, an end wall at each end of the boiler adapted



to enclose the furnace cavity, a central tube bank intermediate opposite end walls adapted to absorb heat generated in the furnace cavity, and fuel burning apparatus in each end wall arranged to exhaust hot gases oppositely therefrom into the interior of said furnace cavity and over the bank of boiler tubes therebetween.

4,013,046

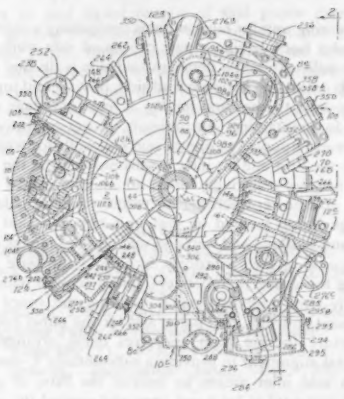
ROTARY ENGINE

Gail W. Kemp, 9622 Vinewood, Dallas, Tex. 75228

Filed Jan. 27, 1975, Ser. No. 544,427

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.27 **44 Claims**



1. A rotary engine comprising: a hollow housing, the inner wall of which defines a portion of a torus shaped gas working space; a rotor rotatably mounted in the hollow housing having a truncated hyperboloid shape and which defines the interior wall of the torus shaped gas working space; seal means between said housing and said rotor; a piston extending outwardly from said rotor with the tip of said piston sealingly and slideably engaging the outer torus wall; a shaft rotatably supported in the housing and being secured to said rotor; a compression-expansion valve; means rotatably securing said compression-expansion valve in said housing, said compression-expansion valve extending into the torus shaped gas working space and rotatably engaging the rotor and pistons, said compression-expansion valve having a notch formed on the outer periphery thereof to allow the piston to pass through the notch; seal means on said compression-expansion valve urged into sealing engagement with said rotor; a combustion chamber in said compression-expansion valve with compression ports and expansion ports formed through the wall of said compression-expansion valve communicating with the combustion chamber and arranged to alternately communicate with the interior of the torus shaped gas working space upon rotation of said compression-expansion valve; a divider valve spaced from said compression-expansion valve arranged to form intake and exhaust sections in the torus shaped gas working space, said divider valve rotatably and sealingly engaging the rotor and pistons, said divider valve having a notch formed in the outer periphery thereof to allow the piston to pass thereby upon rotation thereagainst; drive means to cause the rotation of the compression-expansion valve and divider valve with relation to the rotor to cause the notches of the respective compression-expansion valve and divider valve to be aligned with the pistons when same are passing thereby; intake valve means provided in the inner wall of the housing communicating with the intake space of the torus shaped gas working space located adjacent the divider valve; exhaust ports provided in the inner wall of the housing located adjacent to and on the opposite side of the divider valve from the intake valve means; means to deliver fuel to the combustion chamber; and means to initiate combustion of fuel in said combustion chamber.

4,013,047

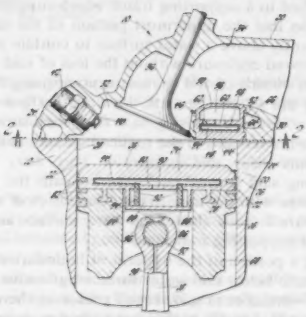
ENGINE WITH COMBUSTION WALL TEMPERATURE CONTROL MEANS

John L. Harned, Grosse Pointe Woods, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 12, 1975, Ser. No. 640,027

Int. Cl.² F01P *9/02*

U.S. Cl. 123—41.2 **8 Claims**



1. A component of an internal combustion engine having a combustion chamber, said component including a portion having first and second heat conducting walls, said first wall bordering a portion of said engine combustion chamber and said second wall bordering a fluid chamber containing in operation a fluid capable of carrying away heat, said component portion defining a sealed cavity between said first and second walls, a third wall dividing said cavity into vaporizing and condensing sections adjacent said first and second walls respectively, said third wall having separate vapor and condensate flow openings therethrough connecting said sections, a charge of vaporizable fluid coolant in said sealed cavity having a volume in the liquid state not greater than the volume of said vaporizing section, and means comprising a predetermined charge of inert gas pressurizing said cavity to establish the vaporizing temperature of said fluid coolant under operating conditions in a predetermined range such that said first

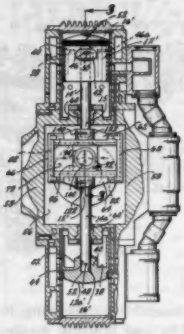
wall will reach a temperature high enough to encourage combustion of air-fuel mixtures adjacent thereto in such combustion chamber before substantial vaporization cooling of said first wall begins and such cooling will reach its maximum before said first wall temperature becomes excessively high.

4,013,048

BOURKE TYPE ENGINE

Daniel M. Reitz, 19024 Leadwell St., Los Angeles, Calif. 91335

Filed Dec. 12, 1975, Ser. No. 640,183
Int. Cl.² F02B *75/28*
U.S. Cl. 123—56 BC **7 Claims**



1. In an internal combustion engine having at least two cylinders disposed coaxially and oppositely so that the free ends of piston rods extending from pistons reciprocable in said cylinders, may be connected by a yoke in coaxial alignment with each other and with the cylinders to reciprocate concurrently as a unit, said yoke having means rotatably to engage a rotating crank by which the force developed by reciprocation of the pistons is converted to rotating driving motion, the improvement which comprises:

a cylindrical recess in the underside of each piston head, said recess being defined in part by a cylindrical wall coaxial with the piston head and extending outwardly therefrom for a predetermined distance, the inside diameter of said cylindrical wall being slightly greater than the outside diameter of the piston rod insertable in said recess, one end of said piston rod being insertable in said recess to abut the piston head, and means to retain said piston rod end in said cylindrical recess while still allowing for sufficient deviation from the common axis to prevent wear in a particular area between each piston and the surrounding wall of the cylinder in which it reciprocates upon such reciprocation during operation of the engine.

4,013,049

MANIFOLD APPARATUS FOR MULTI-CYLINDER MOTORCYCLE ENGINES

Michael H. Dilgard, 13435 N. 31st Drive, Phoenix, Ariz. 85029, and James W. Meir, 3001 W. Las Palmaritas, Phoenix, Ariz. 85021

Filed Aug. 28, 1975, Ser. No. 608,749
Int. Cl.² F02B *75/18*
U.S. Cl. 123—52 M **9 Claims**

1. In an internal combustion engine having a cylinder block and a carburetor spaced apart from the cylinder block, manifold apparatus extending between the carburetor and the cylinder block, comprising, in combination:

flange means, including

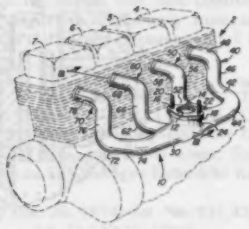
a flange to which the carburetor is secured, and

an aperture extending through the flange through which fuel and air flows from the carburetor;

chamber means disposed beneath the flange means for receiving the fuel and air flow from the carburetor;

header means connected to and communicating with the chamber means and extending to the cylinder block and including

a first portion connected to the chamber means and extending generally horizontally outwardly from the chamber means,



a second portion connected to the first portion and extending generally vertically from the first portion to above the flange, and

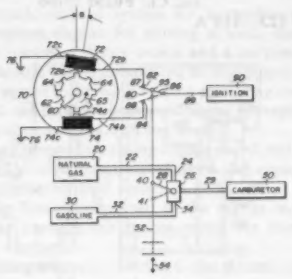
a third portion connected to the second portion and extending generally horizontally above the flange and to the cylinder block.

4,013,050

IGNITION SYSTEM FOR A MULTIFUELED ENGINE

Melvin Arthur Lace, Prospect Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 28, 1975, Ser. No. 554,281
Int. Cl.² F02P *5/04*
U.S. Cl. 123—117 R **8 Claims**



1. In the ignition system of an engine adapted to burn any one of a plurality of fuels

means for automatically setting the static ignition timing to a predetermined one of several values responsive to the selection of the particular fuel to be burned.

4,013,051

AUTOMOTIVE CRANKCASE EMISSION CONTROL SYSTEM

Ross M. Parcels, 2666 Mark Lane, West Linn, Oreg. 97068

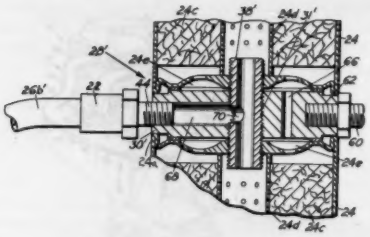
Filed July 8, 1974, Ser. No. 486,496
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 B **2 Claims**

1. A filter for use in an emission control system of vehicles of the type having a crankcase, fuel intake means including a fuel mixing device, a valve cover, a conduit extending from the valve cover to the fuel intake means ahead of the fuel mixing device to direct crankcase fumes to the fuel intake, and a pollution control valve in the conduit, said filter comprising

a. a disc-like body member having opposite face surfaces,

b. means on said body member arranged to secure it to a vehicle,

c. a stud member threadedly supported axially in said body member and projecting beyond one face surface thereof,
d. a spin-on type filter having inlet and outlet portions and also having a threaded bore engageable by said stud member to provide removable mounting of said filter on said body member,



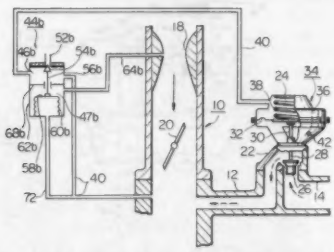
e. inlet means in said body member arranged to connect a conduit which extends from a valve cover into said inlet portion of said filter,
f. and outlet means in said body member arranged to connect a conduit from the outlet portion of said filter to a pollution control valve.

4,013,052

EXHAUST GAS RECIRCULATION CONTROL DEVICE

Kenji Masaki, and Shuya Nambu, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 391,533, Aug. 27, 1973, Pat. No. 3,896,777. This application May 1, 1975, Ser. No. 573,620
Claims priority, application Japan, Aug. 31, 1972, 47-86711
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **2 Claims**



1. In an exhaust gas recirculation system having a recirculation conduit to recirculate a portion of exhaust gases from the exhaust system of an internal combustion engine to the intake system thereof having a carburetor; a vacuum actuated exhaust gas flow metering valve normally closing the recirculation conduit; a diaphragm device operatively connected to the metering valve and a vacuum conduit connecting the spring loaded side of the diaphragm device to the intake manifold for actuation of the diaphragm device by the intake manifold vacuum to operate the metering valve,

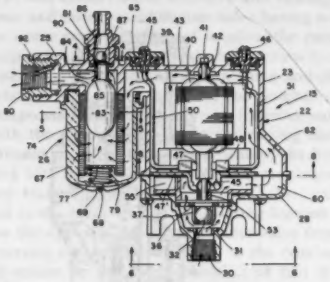
a modulating device comprising a casing having a chamber, partition means dividing said chamber into a first compartment and a second compartment, said first compartment forming part of said vacuum conduit, means defining a bleed port opening to said first compartment, a valve to control air flow rate through said bleed port, a bellows in said second compartment, one end of said bellows being operatively connected to said valve, an opposite end of said bellows being securely fixed to said casing, a first conduit means connecting said compartment to the venturi of said carburetor and a second conduit means connecting the interior of said bellows to said intake manifold.

4,013,053

FUEL PUMP

Henry T. Dinkelkamp, Mount Prospect; Bryce W. Carus, Grayslake, and Robert J. Norman, Elmhurst, all of Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.

Filed May 2, 1975, Ser. No. 573,810
Int. Cl.² F02M *39/00*
U.S. Cl. 123—136 **5 Claims**



1. A fuel pump assembly, comprising; housing means, motor means connected in said housing means, inlet means in the bottom of said housing means beneath said motor means, a centrifugal pump in said housing means between said motor means and said inlet means, said housing means defining a float bowl, said centrifugal pump having an outlet connected to said float bowl so that the pump delivers fuel to said float bowl, a vacuum fitting at the upper end of said float bowl and having a vacuum fitting valve seat, a float valve member movable in said float bowl and engageable with said valve seat to prevent flow of fuel to said source of vacuum, an outlet passage in said float bowl adapted to be connected to a carburetor, said float bowl having a filter cartridge therein and said float valve member being slidable in said filter cartridge.

4,013,054

FUEL VAPOR DISPOSAL MEANS WITH CLOSED CONTROL OF AIR FUEL RATIO

Richard L. Balsley, and Louis J. Faix, both of Washington, Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 575,344, May 7, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 664,541
Int. Cl.² F02M *59/00, 13/06*
U.S. Cl. 123—136 **1 Claim**

1. In combination with an internal combustion engine having an air-fuel induction passage and an exhaust passage and wherein the combustion products in the exhaust passage are determined in part by the air-fuel ratio in the induction passage:

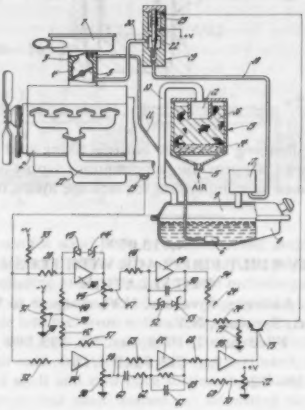
means comprising a liquid fuel supply reservoir and a fuel vapor space in communication therewith, said fuel vapor space including a fuel vapor storage element effective to store fuel vapor evaporating from the liquid fuel supply reservoir and thus prevent its escape to the atmosphere and means communicating the fuel vapor storage element to the atmosphere when the pressure in the fuel vapor storage element falls below atmospheric to allow the influx of atmospheric air through the fuel vapor storage element to flush stored fuel vapor therefrom into said fuel vapor space;

a carburetor effective to meter predetermined amounts of liquid fuel from the reservoir to the induction passage to form the air-fuel mixture therein;

a sensor in the exhaust passage responsive to the constitu-

ents therein and effective to generate a signal therefrom indicative of the air-fuel ratio in the induction passage relative to a predetermined air-fuel ratio; and

means responsive to the sensor effective to communicate the fuel vapor space to the lower than atmospheric pressure of the induction passage and flow fuel vapor from the fuel vapor space and fuel vapor storage element to the induction passage to augment the liquid fuel supplied to the air-fuel mixture, said last means modulating the



amount of flow in sense to increase the fuel content in the air-fuel mixture when the sensor indicates an air-fuel ratio leaner than the predetermined air-fuel ratio and to decrease the fuel content in the air-fuel mixture when the sensor indicates an air-fuel ratio richer than the predetermined air-fuel ratio, whereby the engine tends to operate at the predetermined air-fuel ratio and the vapor stored in said fuel vapor storage element is supplied to the engine for combustion without upsetting the predetermined air-fuel ratio.

4,013,055

INJECTION PUMP FOR AIR-COMPRESSING INJECTION-TYPE INTERNAL COMBUSTION ENGINE

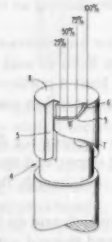
Helmut Sommer, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed May 2, 1975, Ser. No. 574,011

Claims priority, application Germany, May 4, 1974, 2421668

Int. Cl.² F02F *3/28*

U.S. Cl. 123—139 AR **17 Claims**



1. In an injection pump for an air-compressing injection-type internal combustion engine, said injection pump comprising at least one pump structure including cylinder means and piston means, said piston means having control edge means for controlling fuel feed during rotation of said piston means in said cylinder means, the improvement comprising said control edge means controlling the content of exhaust gas pollutants of said engine by controlling the feed beginning of the fuel in a predetermined manner, wherein said control edge means delays at a constant amount the feed beginning over a range of engine loads from idling rotational speeds to a predetermined engine load of 75% of full load as compared to the feed beginning at full engine load, said control edge means advancing feed beginning rectilinearly from said predetermined engine load to the feed beginning at full load.

4,013,056

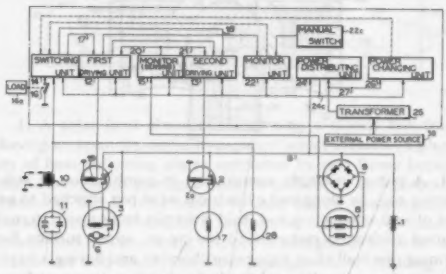
AUTOMATIC CONTROL SYSTEM FOR A GASOLINE-POWERED COMBUSTION ENGINE

Yasuhito Yamaki, Tokyo, and Kunio Aiage, Gyoda, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1974, Ser. No. 537,432

Int. Cl.² F02N *17/00*

U.S. Cl. 123—179 BG **9 Claims**



1. An automatic control system for a gasoline-powered internal combustion engine for driving a load, the engine having ignition means, a starter motor and a carburetor provided with a throttle valve, comprising in combination:

first sensing means for sensing varying operating conditions of the load and producing an input signal in response to a given operating condition of the load;

second sensing means for sensing engine speed and producing a speed discriminator signal when the engine speed reaches a predetermined value;

first actuating means connected to the starter motor and operable to energize the starter motor for starting the engine;

second actuating means connected to the throttle valve and operable for actuating the throttle valve;

switching means connected at its input to said first sensing means and at its output to the ignition means, said switching means being responsive to said input signal and producing an operating signal in response thereto for energizing the ignition means;

first driving means connected at its input to said switching means and to said second sensing means and at its output to said first actuating means, said first driving means being responsive to said operating signal from said switching means and producing a first output signal in response thereto for energizing said first actuating means thereby to energize the starter motor, and further responsive to said seed discriminator signal for cutting off said first output signal in response thereto for de-energizing said first actuating means thereby to de-energize the starter motor when the engine speed reaches the predetermined value; and

second driving means connected at its input to said switching means and at its output to said second actuating means, said second driving means including means for producing a second output signal for a predetermined time, interval in response to said operating signal;

said second actuating means for closing the throttle valve in

the presence of said second output signal so that enriched air-fuel mixture is supplied to the engine to initiate the starting of the engine, and for opening the throttle valve to a predetermined opening degree in the absence of said second output signal, so that the engine is allowed to continuously operate to drive the load in the presence of said input signal.

4,013,057

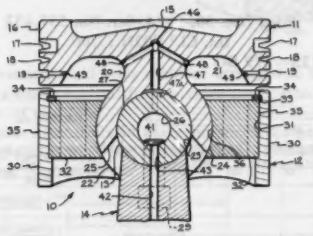
PISTON ASSEMBLY

William D. Guenther, Hagerstown, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed May 14, 1975, Ser. No. 577,562

Int. Cl.² F02F *3/00*

U.S. Cl. 123—193 P **4 Claims**



1. A piston assembly comprising, in combination, a connecting rod, an elongated cylindrical wrist pin attached to an end of said connecting rod, said wrist pin having an external journal surface, a piston head having an upper surface for forming one wall of an expansion chamber and having a bearing member extending substantially across a lower surface, said bearing member having an interior bearing surface engaging the journal surface of said wrist pin substantially along its entire length and having an exterior journal surface concentric with said interior bearing surface, said bearing member and said wrist pin cooperating to permit rotation between said connecting rod and said piston head, a piston skirt, and thrust bearing means attaching said skirt to said external journal surface of said bearing member for rotational movement between said piston head and said piston skirt.

4,013,058

RECIPROCATING PISTON ENGINE CONSTRUCTION, PARTICULARLY MULTI-PART CYLINDER AND CRANKSHAFT CONNECTION ARRANGEMENT

Reinhard Häfner, Kissing; Karl Wojik, and Gerhard Schlenker, both of Augsburg, all of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg AG, Augsburg, Germany

Filed Nov. 7, 1974, Ser. No. 521,695

Claims priority, application Germany, Nov. 27, 1973, 2358954

Int. Cl.² F02F *1/00;* **F16B** *35/00*

U.S. Cl. 123—195 AC **18 Claims**

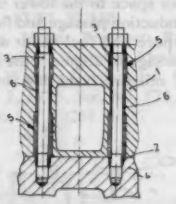
1. Reciprocating piston engine having a multi-part cylinder-crankshaft construction comprising

at least two separate dynamically loaded structural machine elements (**1, 4**) fitted together at a common junction surface (**2**);

at least two tension bolts (**3, 13, 21**) passing into aligned bores formed in the machine elements and connecting said machine elements together, and means to dampen vibration and high frequency oscillations

without interfering with permitted low frequency excursions in the tension bolts upon dynamic loading during operation of the engine comprising

a cylindrical gap (**6, 17, 23**) formed in at least one of the machine elements surrounding the bolt (**3, 13, 21**) throughout at least a portion of its length to provide a cylindrical chamber extending over said at least portion of the length of the bolt;



a liquid damping substance entirely filling said chamber; and means (**30**) providing a continuous supply of said liquid substance to compensate for leakage losses thereof.

4,013,059

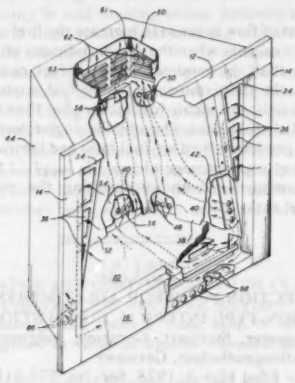
FACTORY-BUILT FIREPLACE WITH FLUSH HEARTH INSTALLATION

George M. Andrews, Syracuse, N.Y., assignor to Vega Industries, Inc., Syracuse, N.Y.

Filed July 7, 1975, Ser. No. 593,799

Int. Cl.² F24B *1/18*

U.S. Cl. 126—120 **10 Claims**



1. A factory-built fireplace having an exterior surface defined by an outside shell for installation in a structure with zero clearance between said outside shell and combustible materials of said structure, said fireplace comprising, in combination:

a. a combustion chamber having an open front and a hearth floor;

b. a wall having exterior and interior surfaces and defining one side of the open front of said combustion chamber;

c. means, including at least a portion of the interior surface of said wall, defining an air flow passage having upper and lower ends;

d. said wall having an opening for flow of air into said air flow passage at said upper end thereof;

e. means supporting said hearth floor to define a space thereunder;

f. inlet means through which said air flow passage communicates at said lower end thereof with the space under said hearth floor; and

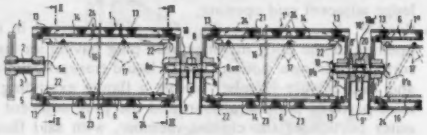
g. outlet means defining a path for flow of air out of the space under said hearth floor in a location remote from said inlet means, the relative sizes and locations of said inlet and outlet means, said air passage and said wall

opening being such that sufficient cooling air is provided solely by the air entering said wall opening.

4,013,060
ROTARY GRATE

Johannes Josef Martin, Leopoldstrasse 248, 8 Munich 40, Germany

Filed Aug. 6, 1975, Ser. No. 602,399
Claims priority, application Germany, Aug. 9, 1974, 2438448
Int. Cl.² F23H *1/02*
U.S. Cl. 126—163 R **21 Claims**

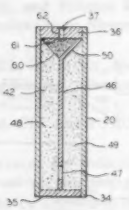


1. In a grate for solid fuels in uncombusted and/or at least partially combusted state, a combination comprising a rotor assembly including at least one rotor unit including a fuel-contacting hollow drum-shaped shell having openings for introduction of air into fuel from within said shell and a hollow core mounted in said shell and having an apertured cylindrical wall defining with said shell at least one compartment; means for rotating said shell and said core to thereby advance the fuel which contacts said shell; means for admitting air into said core, at least at one axial end of said wall, so that the thus admitted air enters said compartment by way of the apertures in said wall and leaves said shell by way of said openings; and an open-ended hollow drum received with clearance in the interior of said core, said core being rotatable with respect to said drum and the outer diameter of said drum being less than the inner diameter of said cylindrical wall.

4,013,061
IGNITION SYSTEM FOR CHEMICAL HEATERS

John H. Trumble, Elm Grove; Thomas C. Ehlert, Wauwatosa, and Akos Szekely, Colgate, all of Wis., assignors to Thermology, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 545,206, Jan. 29, 1975, abandoned. This application Mar. 26, 1975, Ser. No. 562,352
Int. Cl.² F24J *1/02*
U.S. Cl. 126—263 **8 Claims**

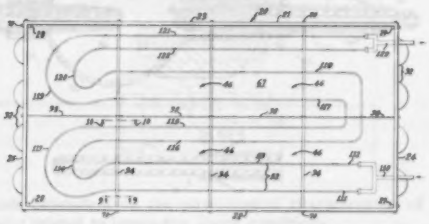


1. A heating unit consisting essentially of:
a hollow hermetically sealed thermo-conductive container,
a quantity of a reactive chemical mixture disposed within and substantially filling said container, said chemical mixture consisting essentially of 0.75–1.25 parts-by-weight aluminum, approximately 1.5–3.5 parts-by-weight of an iron oxide and additionally comprises 0.25–2.50 parts-by-weight of an inert finely divided material,
a cone-shaped quantity of a chemical ignition mixture consisting of aluminum and a material selected from the group consisting of Fe_2O_3 and Fe_3O_4 disposed within said container, said quantity having a base portion and an apex, said base portion being disposed adjacent an interior surface of said container least the apex being embedded in said reactive mixture,
ignition means for igniting the base portion of said ignition mixture.

4,013,062
SOLAR HEAT ABSORBER

Gary W. Laird, P.O. Box 9013, 3231 Trout River Blvd., Jacksonville, Fla. 32208

Filed Aug. 20, 1975, Ser. No. 606,188
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **30 Claims**



1. A solar heat absorber comprising a closed box frame having an open top and a transparent cover therefor, a plurality of heat collecting plates supported by said frame beneath said cover, fluid passage means attached to said plates for removing the heat collected by said plates, compartmental means within said box frame for forming a plurality of dead air spaces and for separating respective said plates between said frame and said cover, said fluid passage means including
A. an inlet tube section communicating with a fluid inlet downwardly of one of said dead air spaces and passing through said one dead air spaces into another of said dead air spaces juxtaposed to said one dead air space,
B. an outlet tube section passing from said juxtaposed dead air space into said one dead air space and communicating outwardly of said one dead air space, and
C. a bent tube section coupling said inlet tube section and said outlet tube section in said juxtaposed dead air space whereby hotter fluid within said outlet tube section is reintroduced into said one dead air space for transference of some of the heat thereof into said one dead air space and thence into said cooler fluid within said inlet tube section therewithin before passing outwardly of said outlet tube section.

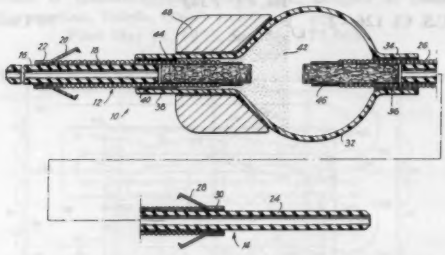
4,013,063
IMPLANT FOR REVERSIBLY PREVENTING CONCEPTION

Louis Bucalo, 155 Roberts St., Holbrook, N.Y. 11741

Continuation-in-part of Ser. No. 513,292, Oct. 9, 1974. This application Apr. 14, 1975, Ser. No. 568,138
Int. Cl.² A61B *19/00*
U.S. Cl. 128—1 R **15 Claims**

1. In an implant for reversibly preventing conception, a pair of elongated open-ended tubular means spaced from each other and respectively having inner ends directed toward and outer ends directed away from each other, an intermediate housing means fluid-tightly connected with said pair of tubular means at the regions of said inner ends thereof for defining between said pair of tubular means a space with which both of said tubular means communicate and through which fluid can flow between said pair of tubular means, said housing means having in its interior a particulate means made up of a plurality of fine particles of a material which responds to magnetic forces, said housing means accommodating said particulate means in said housing means for movement between a conception-preventing position in a path of fluid flow between

said pair of tubular means and a conception-enabling position out of the path of flow between said pair of tubular means through the interior of said housing means, each of said tubular means carrying at its inner end region a barrier means for permitting fluid to flow through said inner end region of each tubular means while preventing the particles from flowing in any appreciable numbers therethrough, and a permanent magnet means located adjacent said housing means for attracting said particles to said conception-preventing position with a magnetic force urging said particles against each other



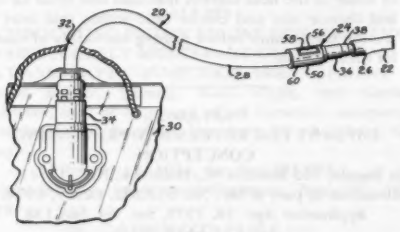
sufficiently to form from said particles a body having a density sufficiently great to prevent sperm from flowing through said body in numbers sufficient for conception while still permitting fluid in which sperm are normally suspended to flow past the particles, whereby a fluid which normally carries sperm will flow through both of the tubular means while sperm will be retained by said particles when they are in said conception-preventing position, while when the particles are in said conception-enabling position, free flow of fluid with sperm therein is provided when conception is desired.

4,013,064

PORT MEANS FOR A LIQUID TRANSPORT SYSTEM

Bhupendra C. Patel, Elgin, and Frank K. Villari, Oak Park, both of Ill., assignors to The Kendall Company, Boston, Mass.

Filed June 26, 1975, Ser. No. 590,787
Int. Cl.² A61B *10/00;* **A61M** *25/00*
U.S. Cl. 128—2 F **14 Claims**



1. Port means for a liquid transport system, comprising:

a relatively rigid body member having an inner surface defining a sidewall of a liquid transport lumen, and an opening extending through a side of the body member and communicating between the lumen and the outside of the body member;

a flexible closure member having a plug received in the opening of the body member, said plug having an inner surface defining a sidewall of the liquid transport lumen, and said closure member having an outer surface defining a location for receiving a needle to penetrate the plug and establish communication with the liquid transport lumen by a tip of the needle;

means for securing the closure member to the body member with the plug received in said opening, the securing means comprising a flexible band of the closure member extending around an outer surface of the body member; and

a liquid drainage tube secured to one end of the body member and having a lumen in communication with the lumen of the body member, with one end of said band covering the end portion of the tube secured to the body member.

12. Port means for a liquid transport system, comprising:

a relatively rigid body member having an inner surface defining a sidewall of a liquid transport lumen, an opening extending through a side of the body member and communicating between the liquid transport lumen and the outside of the body member, and a cutout defining a ledge adjacent said opening;

a flexible closure member having a plug received in the opening of the body member, said plug having an inner surface defining a sidewall of the liquid transport lumen, and said closure member having a flange extending at least partially peripherally around the plug adjacent an outer portion of the closure member, with said flange being located on said ledge of the body member, and an outer portion having an outer surface defining a location for receiving a needle to penetrate the plug and establish communication with the liquid transport lumen by a tip of the needle; and

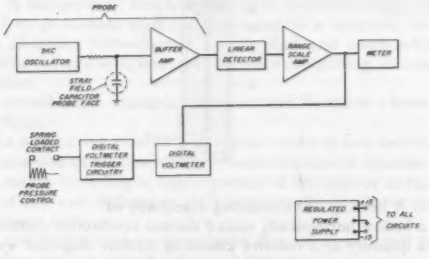
means for securing the closure member to the body member with the plug received in said opening, the securing means comprising a retaining member extending around and covering at least a portion of said flange, said retaining member having a rim including an inwardly directed outer portion defining an opening to receive the outer portion of the closure member, said rim having a side portion depending from the outer rim portion, with the outer and side portions of the rim defining a recess to receive the closure member flange, and with the rim side portion being secured to the body member to retain the closure member in place with the closure member flange located intermediate the rim and body member ledge in the rim recess and with the closure member outer portion projecting into the rim opening.

4,013,065

MOISTURE DERMATOMETER

Melvin Copeland, Nanuet, and William Peter Konazewski, South Spring Valley, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Feb. 23, 1976, Ser. No. 660,591
Int. Cl.² A61B *5/05*
U.S. Cl. 128—2 R **6 Claims**



1. A device for measuring moisture in a moist substrate which comprises, a stray field capacitor for making contact with said substrate, means to provide an oscillating signal to said stray field capacitor, and means to detect and read a modified signal produced by said stray field capacitor in contact with said moist substrate, said stray field capacitor comprising yieldable means to urge it against the skin under pressure, said means further comprising means to trigger said read means at a predetermined pressure.

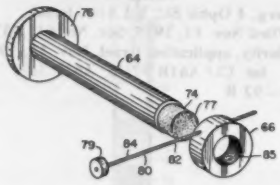
4,013,066
PROCESSES FOR MENSTRUAL CYCLE PHASE DETERMINATION

Samuel R. Schuster, Wellesley, Mass., assignor to Ovutime, Inc.

Continuation-in-part of Ser. No. 472,611, May 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 300,187, Oct. 24, 1972, abandoned. This application Nov. 7, 1975, Ser. No. 629,700

Int. Cl.² A61B *10/00*; **G01N** *33/16*

U.S. Cl. 128—2 R **6 Claims**



1. A method for determining menstrual cycle phase comprising the steps of:

a. inserting a probe having an inner bearing element at a working end into a cavity for obtaining a viscous mucus sample, said inner bearing element carrying said mucus sample;

b. removing said probe from the cavity;

c. placing said inner bearing element within an outer bearing element;

d. constraining said inner bearing element within said outer bearing element for relative movement therebetween;

e. biasing said probe for indicating menstrual cycle phase by relative movement between said inner bearing element and said outer bearing element, said probe biased with sufficient force to cause relative movement between said inner bearing element and said outer bearing element when the viscosity of said mucus sample is low and with insufficient force to cause relative movement between said inner bearing element and said outer bearing element when the viscosity of said mucus sample is high.

4,013,067
WARNING APPARATUS FOR INDICATING A THREAT OF IMPENDING SHOCK

Heinz Kresse, Erlangen, and Helmut Reichenberger, Brand, both of Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

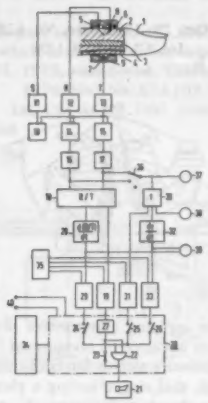
Filed May 22, 1975, Ser. No. 579,801

Claims priority, application Germany, June 26, 1974, 2430788

Int. Cl.² A61B *5/02*

U.S. Cl. 128—2.05 R **8 Claims**

1. In a warning apparatus for indicating the threat of impending shock in a patient, including photoelectric pulse pickup means adapted to be applied to the skin of said patient and comprising at least one light transmitter and at least two light receivers, said light transmitter comprising substantially a light source, said light receivers converting incident light into corresponding electrical signals, said receivers comprising combined reflection and transmission receivers; signal comparison means having at least one threshold discriminator set to predetermined critical threshold values corresponding to upper and lower boundary values and being operatively connected to said pulse pickup means for comparing simultaneously signals obtained from a reflection and transmission measurement with said boundary values and to generate an output signal; and alarm means responsive to said output signal for initiating an alarm when the signals compared by said comparison means with said boundary values exceed or fall below said boundary values, said signals from said pickup means comprising simultaneous transmissive and reflective



signals dependent on the physiological characteristics of a patient related to impending shock conditions.

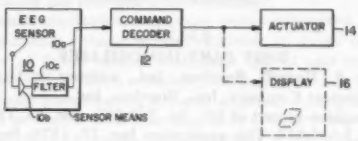
4,013,068
ELECTROENCEPHALOGRAPHIC ACTIVATED CONTROL SYSTEM

Wayne L. Settle, 1311 33rd Ave., and Lowell G. Funston, 1309 33rd Ave., both of San Francisco, Calif. 94122

Filed Oct. 15, 1974, Ser. No. 514,539

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.1 B **18 Claims**



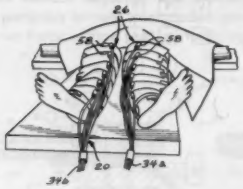
1. An electroencephalographic acutated control system responsive to a plurality of different commands voluntarily encoded on EEG signals in a predetermined serial digital encoding system wherein each command corresponds to a different predetermined number of waves voluntarily generated in a predetermined frequency range of electroencephalographic activity comprising: EEG sensor means for detecting EEG signals including at least the signals comprising said encoded commands, filter means for selecting signals within said predetermined frequency range from the detected EEG signals, command decoder means responsive to the filtered EEG signals for decoding each of said plurality of different commands including counter means for counting the number of waves of said filtered EEG signals to generate digital signals representative of the number of waves of and corresponding to a digital representation of the encoded command and actuator means responsive to said digital signals of said counter means for controlling apparatus adapted to accomplish each of said commands in response thereto.

4,013,069

SEQUENTIAL INTERMITTENT COMPRESSION DEVICE

James H. Hasty, Cary, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Oct. 28, 1975, Ser. No. 625,990
Int. Cl.[2] A61H *1/00*
U.S. Cl. 128—24 R **41 Claims**



1. A device for applying compressive pressures against a patient's limb from a source of pressurized fluid, comprising:

an elongated pressure sleeve for enclosing a length of the patient's limb, said sleeve having a plurality of separate fluid pressure chambers progressively arranged longitudinally along the sleeve from a lower portion of the limb to an upper portion of the limb proximal the patient's heart relative said lower portion;

means for intermittently forming a plurality of fluid pressure pulses from said source in a timed sequence during periodic compression cycles;

means for connecting different pressure pulses of said sequence to separate chambers in the sleeve in an arrangement with later pulses in said sequence being connected to more upwardly located chambers in the sleeve and with each of the pulses being continuously applied to the sleeve after formation by the forming means for the duration of the compression cycle to apply a compressive pressure gradient against the patient's limb by the sleeve which decreases from the lower to upper limb portions; and

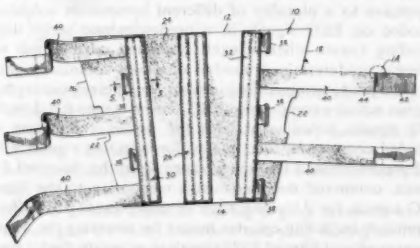
means for intermittently connecting the chambers to an exhaust means during periodic decompression cycles between said compression cycles.

4,013,070

BODY PART IMMOBILIZER

Marlin R. Harroff, Bourbon, Ind., assignor to Orthopedic Equipment Company, Inc., Bourbon, Ind.

Continuation-in-part of Ser. No. 540,505, Jan. 13, 1975, Pat. No. 3,935,858. This application Jan. 27, 1976, Ser. No. 652,751
Int. Cl.[2] A61F *3/00*
U.S. Cl. 128—80 C **11 Claims**



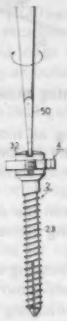
1. An immobilizer for a body part of a patient comprising a flexible cover means having in planar orientation upper and lower edges and opposite side edges, said cover means including an outer surface formed of loop means, rigidifying means, said rigidifying means including hook means for detachable and adjustable securement to said cover means at the loop means thereof, and means for securing said cover means about said body part, said rigidifying means being adjustably secured to said cover means adjacent one said cover means side edge with the hook means of the rigidifying means interlocking with the loop means of the cover means for positioning along said body part when said cover means is applied to the patient.

4,013,071

FASTENERS PARTICULARLY USEFUL AS ORTHOPEDIC SCREWS

Lior Rosenberg, 4 Ophir St., Tel Aviv, Israel

Filed Nov. 11, 1975, Ser. No. 631,137
Claims priority, application Israel, Nov. 11, 1974, 46030
Int. Cl.[2] A61B *17/18*; **A61F** *5/04*
U.S. Cl. 128—92 B **4 Claims**



1. A fastener particularly useful in orthopedic surgery, comprising: an external fastening member having a shank formed with a head at one end, external spiral threads, an internal bore extending axially through the head and at least partly through the shank towards its opposite end, internal threads adjacent to its head and a plurality of side slits formed radially through said opposite end of the shank to said bore to provide a plurality of outwardly expansible tips at said opposite end; an internal spreading member receivable within said bore and being formed with a head and external threads in the same direction as the external threads of the external fastening member; and an insert removably received between the heads of the fastening and spreading members such that when the insert is in position between the two heads and engages them on its opposite faces, the spreading member may be rotated to transmit its rotation to the fastening member in the threading direction, and when the insert is removed, the spreading member may be further rotated to cause it to move axially within the bore of the fastening member and thereby to spread its tips outwardly.

4,013,072

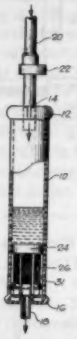
DRIP CHAMBER FOR INTRAVENOUS ADMINISTRATION

Thurman S. Jess, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 3, 1975, Ser. No. 628,275
Int. Cl.[2] A61M *5/16*
U.S. Cl. 128—214 C **4 Claims**

1. In a drip chamber for use in intravenous administration of liquids, comprising an elongated, flexible, transparent hollow housing chamber defining an inlet at one end thereof and an outlet at the other end, said drip chamber being free of venting means, to permit pumping thereof for obtaining and maintaining a constant liquid level therein; hydrophilic filter means positioned adjacent the outlet port, said hydrophilic filter means defining a pore size sufficient to permit the passage of

liquid and to prevent the passage of gas, when wetted, under normal conditions of use, said hydrophilic filter means defining a tubular filter structure positioned generally coaxially with said hollow chamber and spaced from the walls thereof, said tubular filter means defining an open end facing the inlet end of said elongated chamber and a closed end facing the outlet end of said elongated hollow chamber, and an annular



sealing member adjacent said open end of the tubular filter for sealing the annular space between said tubular filter member and the chamber wall; whereby liquid passing through said tubular filter member enters into the bore thereof and passes through said tubular filter to the exterior thereof in the space between said filter and the chamber wall, and thereafter said filtered liquid passes through said outlet port.

4,013,073

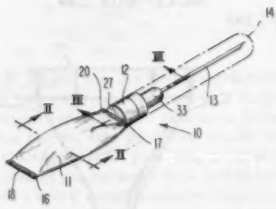
DISPENSING DEVICE

James Robert Cunningham, 2010 Virginia Lane, Philadelphia, Pa. 19401

Filed May 14, 1975, Ser. No. 577,322

Int. Cl.² A61M *5/00*

U.S. Cl. 128—216 **2 Claims**



1. A disposable syringe comprising a collapsible container for containing medicine or the like therein, needle carrier means secured to the container at a discharge end thereof, means closing the container at said end, said needle carrier means including needle means normally being disposed out of communication with the interior of said container but being movably disposed for communicating with the interior of said container for dispensing medicine or the like therefrom, said container being of sufficiently flexible construction to facilitate flattening thereof upon dispensing from the container, said discharge end of said container, at its location of securement to said needle carrier means being free of any non-flattenable zone that would inhibit complete discharge from the container at that end, inhibit complete said discharge end of said container including flaps outwardly of said container end closure, said flaps being in secured engagement with an adjacent end of said needle carrier means outwardly of said end closure.

4,013,074

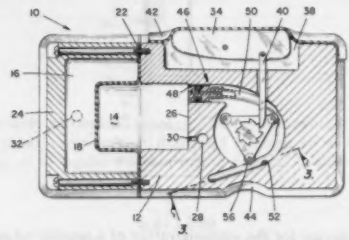
IMPLANTABLE MEDICATION-DISPENSING DEVICE

George G. Siposs, 2855 Velasco Lane, Costa Mesa, Calif. 92626

Continuation-in-part of Ser. No. 481,886, June 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 362,411, May 21, 1973, abandoned. This application Apr. 6, 1976, Ser. No. 674,107

Int. Cl.² A61M *7/00, 5/00*

U.S. Cl. 128—260 **8 Claims**



1. An implantable insulin medication-dispensing device comprising:

a substantially rigid body having a top directed toward the skin and having a bottom directed toward subcutaneous tissue when implanted and having opposed sides;

a chamber in said body having a movable diaphragm member therein to separate said chamber into an insulin reservior and gas chamber;

a refill port in the top of said body connected to said medication reservoir, said refill chamber having resilient plug to permit transcutaneous hypodermic injection of liquid insulin medication from the exterior of the device through said refill port into said reservoir;

a chamber port in the top of said body connected to said chamber, said chamber having a resilient plug to permit transcutaneous hypodermic injection of gas from the exterior of the device through said port into said gas chamber to control gas pressure in said chamber and to measure gas pressure in said chamber;

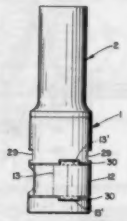
an insulin medication-dispensing pump connected to said medication volume of said reservoir to cause periodic flow of liquid insulin medication out of said reservoir when said device is actuated, said insulin medication-dispensing pump having a pump chamber having an inlet and an outlet such that actuation of said pump causes flow of liquid insulin, an outlet check valve at the outlet termination of said pump chamber outlet directed out of said bottom so that insulin discharge from said outlet check valve discharges insulin out of said medication-dispensing device directly to subcutaneous body tissue to prevent draining of the pump or pump outlet between pumping periods and prevent body tissue from growing into said dispensing pump outlet; and

actuation means connected to said pump for discharging medication from said insulin dispensing device, said actuation means being a manually accessible thrustor so positioned on one of said sides of said body that said thrustor can be transcutaneously manually actuated by transcutaneously manually grasping said opposed sides and actuating said thrustor for actuating said pump for dispensing insulin into the body upon physiological demand, said insulin reservoir, said gas chamber, said refill port, said chamber port, said medication-dispensing port, and said manually accessible thrustor all being mounted in said substantially rigid body so that actuation of said pump to discharge medication does not cause reduction in external volume of said substantially rigid body as a result of reduction in insulin volume in said reservoir.

4,013,075
INHALERS AND INSUFFLATORS HAVING A CUTTING MEANS

Salvatore Cocozza, Milan, Italy, assignor to I.S.F. S.p.A., Milan, Italy

Filed July 15, 1975, Ser. No. 596,176
Claims priority, application Italy, July 15, 1975, 25163/74
Int. Cl.² A61M *15/06, 15/08*
U.S. Cl. 128—266 **24 Claims**



1. A device for the administration of a powdered substance contained in a capsule, comprising:

A. a generally tubular body having a transverse recess intermediate its ends;

B. a carrier member which is pivotally mounted in said transverse recess for pivotal movement, transversely to the axis of said tubular body, out of and into said transverse recess and having a cylindrical bore co-axial with said body for holding said capsule; and

C. cutting means for opening said capsule in order to release the contents cleanly and completely, comprising a pair of cutting blades, each having a circular aperture and being fixedly mounted in said recess at each end of the bore in said carrier member with the centres of the apertures coinciding with the axis of said bore, the arrangement being such that upon pivoting the carrier member containing said capsule into said recess from a position outwardly therefrom, the ends of said capsule are severed by said blades to form an opened capsule and expose the contents of said capsule to the adjacent cavities of said tubular body.

4,013,076
ASPIRATOR JAR

George Puderbaugh, Manlius; Thomas S. Myers, Sherrill; Robert W. Pike, Syracuse, and Robert B. Atley, Sherrill, all of N.Y., assignors to Diemolding Corporation, Canastota, N.Y.

Continuation-in-part of Ser. No. 587,613, June 17, 1975, abandoned. This application Oct. 24, 1975, Ser. No. 625,770
Int. Cl.² A61M *1/00*
U.S. Cl. 128—276 **1 Claim**

1. An aspirator jar for receiving and holding fluids comprising:

a container having a closed bottom, a substantially cylindrical sidewall, and an open mouth portion defined by an annular, outwardly flared beaded rim formed at the top edge of said sidewall;

a lid for said container adapted to engage the rim of said container and having means adapted to engage said rim to provide an airtight seal between the lid and the container;

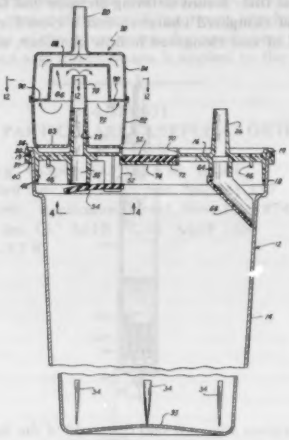
a pressure relief valve in an aperture in said lid communicating with the interior of said jar;

said pressure relief valve comprising a slitted deformable disk placed over said aperture in said lid with said slit generally lying along the diameter of said aperture;

a generally tubular inlet port and associated inlet chamber in said lid for admitting fluid to the interior of said container;

a deflector chute attached to said inlet chamber for directing said fluid against said sidewall;

a generally tubular outlet port and outlet chamber in said lid for use in withdrawing air from the interior of said container, whereby a negative pressure may be developed within the container; and

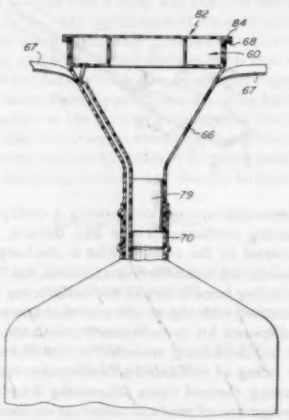


an overflow valve assembly secured to said outlet chamber, said valve assembly including a float responsive to the level of fluid in said container for opening and closing said outlet chamber.

4,013,077
COLLECTING DEVICE

Michael C. Ritota, Newark, and L. Phillip Mancini, Bricktown, both of N.J., assignors to M.E.D.S. Corporation, Newark, N.J.

Continuation-in-part of Ser. No. 508,158, Sept. 23, 1974, Pat. No. 3,938,521, which is a continuation-in-part of Ser. No. 265,343, June 22, 1972, abandoned. This application Feb. 6, 1976, Ser. No. 655,698
Int. Cl.² A61F *5/44*
U.S. Cl. 128—295 **11 Claims**



1. A urine-collecting device for use in the continuous collection of urine from a male penis, comprising

a. an inflatable collar for attachment to a penis, so that upon its inflation, said collar is firmly anchored to said penis said inflatable collar including a first annular member

having an inner and outer diameter and a second annular member having an inner and outer diameter, said second annular member being substantially U-shaped in configuration upon its inflation, said inner diameter of said first annular member and said inner diameter of said second annular member being sealingly attached, and said outer diameter of said first annular member and said outer diameter of said second annular member being sealingly attached, thus forming said closed annular space therebetween, said sealingly attached outer diameters of said first annular member and said second annular member forming the outer diameter of said inflatable collar,

b. an elongated tubular member sealingly attached to said outer diameter of said inflatable collar,

c. collecting means associated with the end of said elongated tubular member remote from said inflatable collar for collection of urine discharged from said penis, and

d. means for inflating said collar.

4,013,078

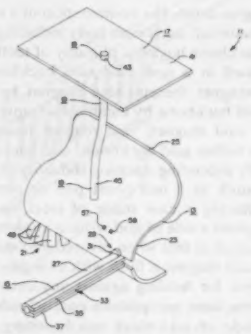
INTERVERTEBRAL PROTECTOR MEANS

James R. Feild, 2254 N. Parkway, Memphis, Tenn. 38112

Continuation-in-part of Ser. No. 526,686, Nov. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 518,523, Oct. 29, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,419

Int. Cl.² A61B *19/00*

U.S. Cl. 128—303 R **28 Claims**



1. Protector means for use following intervertebral and intravertebral and intraspinal surgery at a surgical site on a patient to prevent postoperative adhesions from binding the patient's spinal nerves, said protector means comprising biocompatible shield means for providing an intervening barrier between portions of the patient's dura and spinal nerve roots and the patient's spinal canal structures adjacent the surgical site to prevent development of postoperative adhesions therebetween.

4,013,079

MEDICAL DILATOR

Hans-Joachim Lindemann, Oderfelder Str. 6, 2 Hamburg 13, and Peter P. Wiest, Gotha-Allee 19, 1 Berlin 19, both of Germany

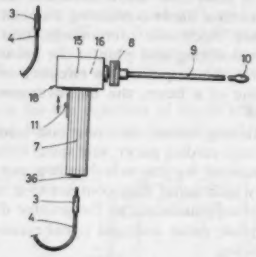
Filed Nov. 11, 1975, Ser. No. 630,819

Claims priority, application Germany, Nov. 13, 1974, 2454351

Int. Cl.² A61M *29/00*

U.S. Cl. 128—341 **18 Claims**

1. A medical dilator particularly for dilating the cervical canal of the uterus comprising, in combination, a housing; a rigid elongated rod-shaped probe connected at one end to said housing and having a free end; a profiled head section on said probe and located on the free end of said probe; and means confined entirely within said housing for applying vibrations transversely to the longitudinal axis of said probe, said probe and said profiled head section being free of said means con-



fined entirely within said housing, said probe having a substantially smaller cross-section than said housing so as to be of such size as to enable dilation of the cervical canal.

4,013,080

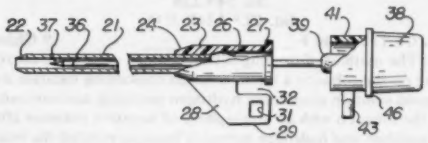
CANNULA CONNECTOR AND DIRECTION INDICATOR MEANS FOR INJECTION SYSTEM

Edward C. Froning, 215 N. San Mateo Drive, San Mateo, Calif. 94401

Continuation-in-part of Ser. No. 511,655, Oct. 3, 1974, Pat. No. 3,941,127. This application June 5, 1975, Ser. No. 584,103

Int. Cl.² A61B *17/34*

U.S. Cl. 128—347 **10 Claims**



1. A cannula comprising a lumen having a central longitudinal bore, a hub on the proximal end of said lumen, a vane extending outward of said bore parallel to said bore formed with an aperture having an axis transverse to said bore, said axis not intersecting said bore.

4,013,081

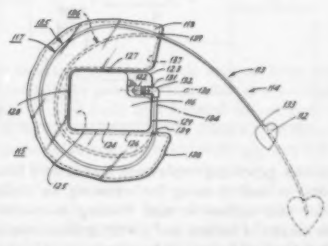
PEDIATRIC CARDIAC PACER SYSTEM

Steve A. Kolenik, Leechburg, Pa., assignor to ARCO Medical Products Company, Leechburg, Pa.

Filed Apr. 19, 1976, Ser. No. 678,265

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 P **8 Claims**



1. In a cardiac pacer system having the combination of a lead, an electrode at the distal end, said electrode being

adapted to contact a signal receiving zone of a heart, a plug at the proximal end of said lead, said plug fitting into a well of a socket in a cardiac pacer, a cardiac pacer, said cardiac pacer containing at least one electrochemical cell as a voltage source said cardiac pacer containing a circuitry unit comprising solid state electronic components, said socket of said pacer accommodating said plug at the proximal end of said lead delivering the output of the circuitry unit to said signal receiving zone of a heart, the improvement which consists essentially of:

plug positioning means directing said lead as a flat spiral around said cardiac pacer, said spiral initially being larger than required by the safe bending radius of the lead, whereby such spiral may contract to a relatively smaller spiral to accommodate to the greater distance between said cardiac pacer and said signal receiving zone as the body grows;

a bag having internal surfaces resistant to tissue growth, said bag permitting said contraction of said spiral because at least a significant portion of said spiral is within said bag;

means restricting movement of said cardiac pacer after implantation while permitting said contraction of the spiral portion of said lead; and

said pacer and lead having dimensions adapted to permit implantation of said cardiac pacer as a pediatric pacer.

4,013,082

TOBACCO EXPANSION PROCESS

William E. Rosen, 2055 Wisteria Lane, Lafayette Hill, Pa. 19444

Continuation of Ser. No. 292,183, Sept. 25, 1972, abandoned, which is a continuation-in-part of Ser. No. 279,851, Aug. 11, 1972, Pat. No. 3,889,689. This application Feb. 12, 1975, Ser. No. 549,226

Int. Cl.² A24B *3/18*

U.S. Cl. 131—140 P **9 Claims**

1. The method of treating tobacco which comprises distributing on the tobacco a liquid solution containing catalase and a liquid solution containing hydrogen peroxide and surrounding the tobacco with an atmosphere of negative pressure after the catalase and hydrogen peroxide have permeated the interstices of the tobacco and begin to react to cause expansion of the tobacco cells under negative pressure.

4,013,083

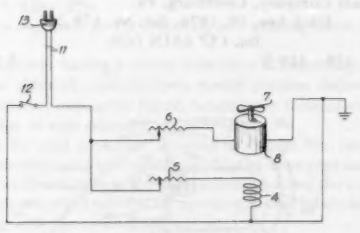
HAIR DRYER

Edward Helbling, 726 E. 10th St., Brooklyn, N.Y. 11230

Continuation of Ser. No. 457,128, April 1, 1974, Pat. No. 3,911,934. This application Oct. 8, 1975, Ser. No. 620,788

Int. Cl.² A45D *20/00*

U.S. Cl. 132—9 **3 Claims**



1. In a hair-grooming implement including a housing, impeller means in said housing for creating an airflow, heating means for said airflow in said housing in cascade with said impeller means, a hollow body with at least one outlet, and a conduit extending from said housing to said body for conveying a flow of hot air to said outlet, the combination therewith of first control means for variably energizing said heater means, second control means for variably energizing said impeller means, manual operating means coupled with one of said control means for adjusting same independently of the other of said control means, and link means for selectively coupling said other of said control means with said operating means for simultaneous adjustment of both said control means to vary the energization of said heater means and said impeller means in the same sense.

4,013,084

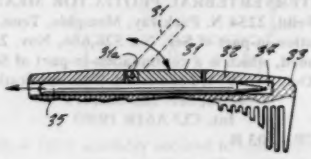
MAGNA COMB

Joseph Guida, 287 Sycamore Lane, South Hauppauge, N.Y. 11722

Filed Feb. 6, 1976, Ser. No. 655,828

Int. Cl.² A45D *24/00*

U.S. Cl. 132—11 R **1 Claim**



1. In a magna-comb, the combination of a comb body made of a plastic material, said comb body including a longitudinally extending backbone having a plurality of teeth along one edge thereof formed in a row, and said backbone supporting a permanent magnet therein, said magnet being pivotally attached to said backbone by means of a transverse pin through one end of said magnet, said magnet being pivotable outwardly from within said backbone, said backbone including a longitudinally extending opening slideably receiving a writing implement such as a ball point pen or pencil, said writing implement having a case made of steel, said magnet being pivotable against a side of said writing implement, said magnet being positioned so that when pivoted into said backbone then one side of said magnet is flush with a longitudinal side edge of said backbone for holding against any exterior steel surface and at a same time an opposite parallel side of said magnet engages a side of said steel cased writing implement, said opposite side in said pivoted position being aligned accordingly with a side of said opening, said writing implement being longer than said magnet, so that opposite ends of said writing implement prevent transverse shift of said writing implement, so that said writing implement thus retains said magnet in said position within said backbone.

4,013,085

DENTAL CLEANING MEANS AND METHOD OF MANUFACTURE THEREFOR

Charles E. Wright, 3167 Bayview Ave., Willowdale, Ontario, Canada (M2K 1G2)

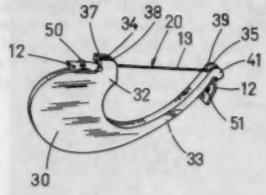
Continuation of Ser. No. 489,134, July 17, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,197

Int. Cl.² A61C *15/00*

U.S. Cl. 132—89 **3 Claims**

1. Dental cleaning means comprising an elongated strip of polymeric material, said strip having terminal portions removably securable to a holder and connected by a flat unitary flexible elongated intermediate member integral therewith, said intermediate member being of reduced width and thickness compared to said terminal portions for insertion between the teeth for tooth cleaning purposes, said flexible elongated

intermediate member being of substantially linearly molecularly oriented polymeric material and said terminal portions



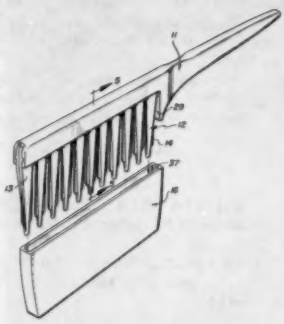
being of substantially molecularly unoriented polymeric material.

4,013,086

COMBING DEVICE

John F. Chmela, 1106 Beechwood Drive, Mount Prospect, Ill. 60056

Filed Oct. 14, 1975, Ser. No. 621,657
Int. Cl.² A45D *24/16*
U.S. Cl. 132—110 **28 Claims**



1. A combing device for conditioning hair as the combing device is combed through the hair comprising, in combination: a comb having a plurality of teeth, said comb being separable along the longitudinal axis thereof so as to be formed by a pair of complementary comb members of a substantially like construction, an insert of an absorbent sheet material removably retained between said pair of complementary comb members, said insert being substantially coextensive in length with the length of said teeth and extending laterally from the sides of the respective ones of said plurality of teeth, said insert further being discontinuous between adjacent pairs of said plurality of teeth so as to permit said combing device to be combed through the hair and to provide wiping surfaces between adjacent pairs of said plurality of teeth for engaging and thereby conditioning the hair as the combing device is combed through the hair, and means for releasably securing said pair of complementary comb members together with said insert therebetween.

4,013,087

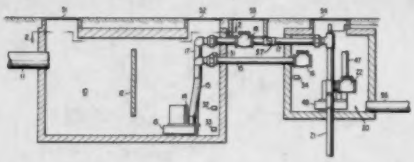
DISPOSAL OF LIQUID EFFLUENT FROM SEWAGE TREATMENT PLANTS

Belah N. Hanna, Honolulu, Hawaii, assignor to Hanna Enterprises, Inc., Kailua, Hawaii

Filed Mar. 10, 1975, Ser. No. 556,928
Int. Cl.² E03F *5/00*
U.S. Cl. 137—110 **17 Claims**

7. A system for the injection of the liquid effluent from a sewage treatment plant into a disposal well, comprising a first tank for accumulating said effluent, a second tank, means for feeding effluent from said first tank to said second tank, a well casing for said disposal well having an opening in said second tank, means for reverse pumping said well, additional pumping means for pumping effluent from said first tank directly into said well casing, and means responsive to the level of effluent in said first tank for controlling the feeding means and additional pumping means.

15. In a system for the injection of liquid effluent from a sewage treatment facility into a disposal well in a porous



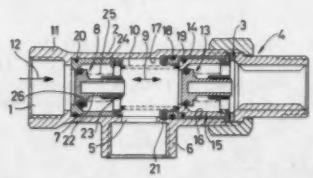
stratum of the earth, a tank for receiving said effluent, a well casing for said well, means for conducting said effluent from said tank into said casing whereby said effluent is caused to flow down said casing into said well and there to be dispersed in the earth, means for reverse pumping said well to force accumulated solid material carried into said well and casing with said effluent up and out of said casing including means for feeding gas under pressure into said well to cause a reverse flow including said solid material up and out of said casing, and means inhibiting flow between said casing and tank during said reverse pumping of said well.

4,013,088

VALVE STRUCTURE

Eberhard Gocke, and Rudolf Vollmer, both of Mosbach, Germany, assignors to Braukmann Armaturen AG, Rothrist, Switzerland

Filed May 19, 1975, Ser. No. 579,009
Int. Cl.² F16K *45/00*
U.S. Cl. 137—116 **7 Claims**



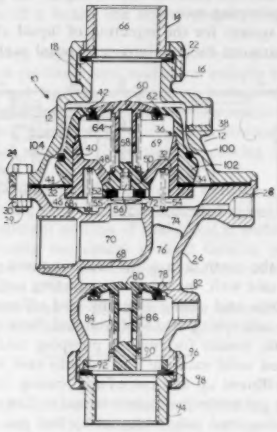
1. A valve structure having a body with an inlet, an outlet and an intermediate by-pass aperture, first and second check valve housings in said body and located respectively before and after said by-pass aperture in relation to the direction of flow, said second valve housing being sealingly secured to said body and said first check valve housing being sealingly but slidably engaged with said body and movable under flow pressure towards said second valve housing to close said by-pass aperture and a first spring bearing said first check valve towards said inlet, said check valve closing through individual springs, said first spring being weaker than said individual springs.

4,013,089

BACK FLOW PREVENTER VALVE

Heinz Werner Braukmann, Willowdale, Canada, assignor to Braukmann Armaturen AG, Rothrist, Switzerland

Filed Sept. 17, 1975, Ser. No. 614,246
Int. Cl.² E03C *1/10*
U.S. Cl. 137—218 **4 Claims**



1. A backflow preventor valve having an inlet and an outlet comprising a hollow valve body, an annular resilient membrane in said valve body, the outer portion of said membrane being secured to said valve body, a rigid annular wall member securing the inward portion of said resilient membrane, said annular wall being spaced from said valve body, an inlet valve sealing against said rigid annular wall, an outlet valve downstream of said resilient membrane, vent means in said valve body intermediate of said resilient membrane and said outlet valve, said rigid annular wall member being adapted to close off said vent means on flow from said inlet to said outlet, a spring biasing said rigid annular wall member against said resilient membrane towards said inlet and spaced apart sealing means of said rigid annular wall and said valve body upstream of said resilient membrane, one of said sealing means being resilient, said sealing means engaging on failure of said membrane due to the biasing action of said spring whereby said vent means remains open to receive any flow from said inlet or backflow from said outlet.

4,013,090

GATE VALVE ROTATING DISC

Julian S. Taylor, 8300 SW. 8, Oklahoma City, Okla. 73108

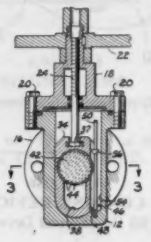
Filed Nov. 10, 1975, Ser. No. 630,554
The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.
Int. Cl.² F16K *43/00*
U.S. Cl. 137—329.05 **3 Claims**

1. In a gate valve having a body provided with a flow passageway and having a disc receiving guide slot transversely intersecting the passageway, a valve stem having one end portion axially movable within the disc slot toward and away from the axis of the passageway by a gate wheel rotatable in opposing directions and having a pair of disc seat rings formed from material having a Rockwell scale C hardness of at least forty disposed, respectively, on the upstream and downstream sides of the disc slot coaxial with respect to the flow passageway and defining confronting seat ring surfaces respectively disposed in the planes forming the upstream and downstream sides of the slot, the improvement comprising:

a metallic disc slidable within the disc slot,

said disc having a head portion removably secured to said one end portion of said valve stem for moving said disc and opening and closing the flow passageway,

said disc having a transverse opening, at least equal in area to the transverse cross sectional area of the flow passageway, in its end portion opposite said disc head portion and having a transverse aperture between its head portion and the opening coaxial with the flow passageway when said disc is in valve closed position and being at least diametrically equal to the diameter of the flow passageway;



a plug formed of material having a Rockwell scale C hardness of at least forty freely received by the disc aperture and slidably interposed between said disc seat rings for coaxially registering and sealing with said disc seat ring on the downstream side of the slot and closing the flow passageway when said disc is moved to a closed position; and,

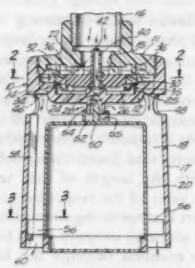
ratchet means within the gate valve body for angularly rotating said plug through a predetermined arc each time said disc is moved to a flow passageway closed position.

4,013,091

FLOAT-CONTROLLED VALVE

George D. Hudson, 120 Hobbs Circle, Santa Paula, Calif. 93060

Filed Apr. 28, 1975, Ser. No. 572,194
Int. Cl.² F16K *31/18*
U.S. Cl. 137—414 **9 Claims**



1. In a float valve for replenishing a body of liquid from a pressurized liquid source in response to drop in the level of the liquid body, wherein a control chamber is in communication with the pressurized source and has a movable wall to exert pressure to close a main valve to cut off the source from the liquid body and a pilot valve operated by a float controls the bleeder port in a fixed wall of the control chamber, and wherein a hood extending downward from said fixed wall of the control chamber forms a float chamber enclosing the float, the improvement comprising:

said fixed wall of the control chamber and said hood being formed in one piece thereby necessitating assembly of the float through the bottom of the hood; and

means inside the hood to limit downward movement of the

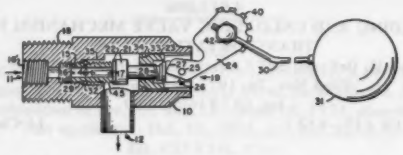
float relative to the hood, said means to limit downward movement of the float comprising cooperative stop means on the float and the hood respectively, said stop means being yieldable to permit the float to be forced past the stop means in the assembly of the float valve.

4,013,092

TWIST-LOCK VALVE IMPROVEMENT

Abraham Isadore Reitman, 10407 Byron Ave., Oakland, Calif. 94603

Filed Apr. 12, 1972, Ser. No. 243,512
Int. Cl.² F16K *31/20*
U.S. Cl. 137—426 **5 Claims**



1. A valve comprising

means defining a valve body member having an inlet and an outlet,

means defining an orifice in said valve body having an inlet port and an outlet port, said inlet and outlet ports respectively in communication with said inlet and outlet of said valve body member,

means for opening and closing said orifice disposed proximate one port of said orifice comprising a valve actuating assembly,

means for connecting said valve actuating assembly to said valve member comprising

means defining a slot in said valve body member having a longitudinal portion and a circumferential portion, and

means defining a pin connected to said actuating assembly and having ends protruding from said actuating assembly adapted to engage said circumferential portion of said slot by passing along said longitudinal portion of said slot to lock in said circumferential portion by rotation of said actuation assembly about the longitudinal axis of said valve body member and remain longitudinally immovable in said slot during operation of said valve,

said valve actuating assembly comprising

an actuating assembly bracket,

a plunger disposed in said actuating assembly bracket having one end disposed proximate one port of said orifice and adapted to engage one port of said orifice and maintain a sealed relation thereto,

a plunger actuating arm disposed proximate the end of said plunger distal said orifice port, said actuating arm pivotally connected to said actuating assembly bracket by said pin and adapted to engage and actuate said plunger,

an operating arm connected to said plunger actuating said arm distal said plunger,

a spring biased against said plunger and said actuating assembly bracket adapted to bias said plunger away from said orifice and against said plunger actuating arm, and

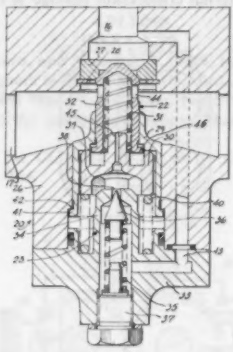
means disposed on said plunger actuating arm for making fixed incremental adjustments in angular relationship between said plunger actuating arm and said operating arm.

4,013,093

HYDRAULIC VALVES

Carlo Pensa, Como, Italy, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Nov. 14, 1975, Ser. No. 632,131
Claims priority, application United Kingdom, Nov. 18, 1974, 49872/74
Int. Cl.² F16K *7/10*
U.S. Cl. 137—491 **9 Claims**



1. A valve comprising a body, wall means defining a first and second conduit in said body, a valve member operable to control flow of fluid between said conduits and movable between a first position wherein said conduits are hydraulically disconnected and a second position wherein said conduits are hydraulically connected, a first element on said valve member, surface means on said element to react with fluid pressure in said conduits to bias said valve member toward said second position, a second element on said valve member and resilient biasing means operative to urge apart said first and second elements, stop means for limiting relative movement between said first and second elements, wall means defining a chamber, a restrictive passage between said first conduit and said chamber, fluid pressure in said chamber biasing said valve member toward said first position, and relief valve means operable to allow fluid to flow from said chamber upon attainment of a predetermined pressure therein.

4,013,094

4-WAY VALVE FOR SEPARATING OF TWO LIQUID SUPPLY LINES, ESPECIALLY IN DAIRIES AND SIMILAR PLANTS

Erkki Pietari Niskanen, Kissankellontie 13, 00700 Helsinki 70, Finland

Filed Sept. 24, 1975, Ser. No. 616,216
Claims priority, application Finland, Oct. 23, 1974, 3104/74
Int. Cl.² F16K *11/16*
U.S. Cl. 137—597 **4 Claims**

1. A four-way valve for selectively connecting two liquid supply lines separately to a container for conducting a liquid into and out from said container, comprising a valve housing which defines:

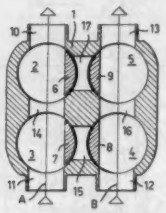
four valve chambers;

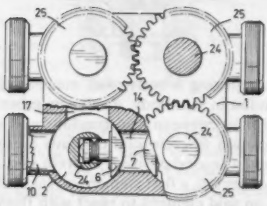
four internal connection passages whereby each of said valve chambers is connected to two others of said valve chambers, each valve chamber being connected by said internal passages to only two others of said valve chambers; and

four external connection passages communicating with said four valve chambers respectively and providing two inlets to the valve and two outlets therefrom,

and the valve further comprising four rotary slide members fitted in the valve chambers respectively and cooperating with the valve housing so that each slide member is capable of

closing off selectively either of the internal connection passages connected to the valve chamber in which it is fitted while leaving open both the other such internal connection passage and the external connection passage communicating with the valve chamber, said four rotary slide members being operatively coupled to each other so that in a first operational position of the rotary slide members a first internal connection passage is closed at both ends by first and second slide members respectively, a second internal connection passage is closed at both ends by third and fourth slide members respectively, a third internal connection passage is open and con-





nects first and second of the external connection passages together, and the fourth internal connection passage is open and connects the third and fourth external connection passages together, whereas in a second operational position of the slide members the third internal connection passage is closed at both ends by the first and third slide members respectively, the fourth internal connection passage is closed at both ends by the second and fourth slide members respectively, the first internal connection passages is open and connects the first and third external connection passages together, and the second internal connection passage is open and connects the second and fourth external connection passages together.

4,013,095

REGULATOR DEVICE FOR CONTROLLING THE FLOW OF A LIQUID

Reinhard Kurz, Hauptstrasse 6, 6369 Nidderau 3, Germany

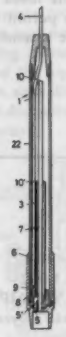
Continuation-in-part of Ser. No. 390,226, Aug. 21, 1973, Pat. No. 3,906,978. This application Feb. 3, 1975, Ser. No. 546,772

Claims priority, application Germany, Aug. 22, 1972, 2241215; Feb. 5, 1974, 2405303

Int. Cl.² A01G *25/00*

U.S. Cl. 137—599 **7 Claims**

1. A regulator device for controllably supplying a liquid to a suction means which comprises an enclosed chamber, an outflow conduit extending into said chamber to deliver liquid therefrom to said suction means, a plurality of inflow conduits extending within said chamber, and adjustable gate means operable to selectively block and unblock at least one of said inflow conduits to direct liquid outside the chamber to flow into the chamber through a corresponding inflow conduit, said outflow conduit having an inlet below a liquid level location in said chamber, each of said inflow conduits having an outlet at a different height above said liquid level location in said chamber, the outlet height of each inflow conduit corresponding to the magnitude of the suction pressure required to draw liquid



from the chamber through the outflow conduit when liquid flows into the chamber through that inflow conduit.

4,013,096

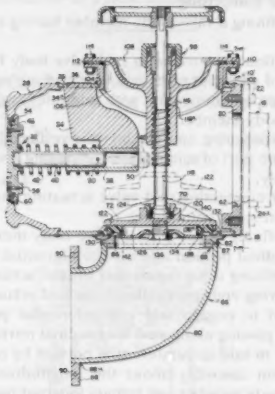
LOADING AND UNLOADING VALVE MECHANISM FOR TRANSPORTATION TANK

Joseph H. DeFrees, 505 Liberty St., Warren, Pa. 16365

Filed Nov. 28, 1975, Ser. No. 635,809

Int. Cl.² F16K *19/00*

U.S. Cl. 137—612.1 **11 Claims**



1. A fabricated adapter valve for use in loading and unloading a transportation storage tank comprising, a hollow body portion, a coupling portion secured to one end of the body portion in liquid-tight relation, said coupling portion having a liquid inlet opening therein, said coupling portion being adapted for coupling to a compatible loading coupler of a liquid loading station for the tank, a coupling flange secured in liquid-tight relation to the other end of said body portion adapted for coupling to a liquid flow conduit to the tank, said flange defining a liquid exit opening therein for flow of liquid through said valve, said body portion having a liquid exit opening formed therein, an outlet assembly secured to said body portion at said liquid exit opening therein adapted for unloading liquid from the tank, said outlet assembly including a transition fitting having a base wall portion with a port therethrough, said fitting being secured in liquid-tight relation to said body portion at said liquid exit opening therein, said port communicating said outlet assembly with the interior of

said body portion, said transition fitting comprising a ring-like member in plan having arcuate side walls which reach a maximum height adjacent one transverse axis of said ring-like member and projecting outwardly from said base wall portion thereof and which diminish to substantially zero height adjacent another transverse axis of said ring-like member disposed generally perpendicular to the first mentioned axis, said body portion being of generally cylindrical tubular configuration, said port of said fitting being generally axially aligned with the axial center of said exit opening in said body portion, weld means securing said transition fitting to the exterior of said body portion in said liquid-tight relation, said transition fitting including locater lugs for positioning said fitting in said exit opening of said body portion for attachment of said fitting to said body portion, and wherein said locater lugs include opposed vertically elongated lugs disposed on the interior of said side walls at the first mentioned transverse axis coacting in locating relation with the periphery of said exit opening in said body portion, and including other opposed lugs on said fitting projecting outwardly from said base wall portion at said other transverse axis, the last mentioned lugs being adapted for locating coaction with the periphery of said exit opening in said body portion, said locator lugs being disposed interiorly of said transition fitting and in non-interfering relation to said port thereof.

4,013,097

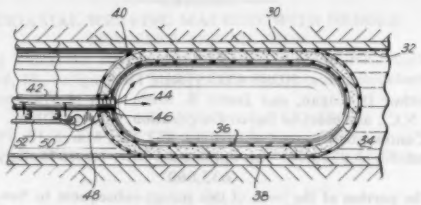
APPARATUS AND METHOD FOR DAMMING A PIPELINE

Anthony Louis Calandra, 5809 Betty Drive, Savannah, Ga. 31406

Continuation of Ser. No. 484,211, June 28, 1974, abandoned. This application Oct. 10, 1975, Ser. No. 621,535

Int. Cl.² F16L *55/12*

U.S. Cl. 138—93 **2 Claims**



1. A puncture-resistant apparatus for temporarily damming, in its expanded configuration, the flow of fluid through a conduit of predetermined size to permit repairs to be made downstream of said apparatus, and being adapted to be passed into and out of said conduit in a collapsed condition, comprising the elements of: (a) a flexible, expandable outer bag having an ellipsoidal shape in its expanded configuration, the distance between elongate sides thereof being equal to or greater than the interior diameter of said conduit of predetermined size, said outer bag being formed of rubber or polymeric material and being adapted to flexibly conform to and seal tightly against a length of the interior surface of said conduit; (b) an inner, inflatable bladder having an ellipsoidal shape in its expanded configuration, the distance between elongate sides thereof being less than the interior diameter of said conduit of predetermined size, said inner inflatable bladder being substantially concentrically disposed within said outer bag so as to create an annular space between said bladder and bag and being formed of rubber or polymeric material; (c) a pressure transmitting liquid in the said annular space defined between said outer bag and inner bladder, said pressure transmitting liquid consisting essentially of water and a viscosity increasing agent; (d) an umbilical tube attached to said bladder adapted to convey pressurizing air to and from said bladder, said umbilical tube comprising a length of flexible tubing communicating at one end with said bladder and including valve means at the end remote from said bladder for controlling passage of pressurizing air; and (e) a lanyard for pulling the apparatus from said conduit of predetermined size, said lanyard being connected at one end thereof to said outer bag and extending along said umbilical tube to the end thereof remote from said bag.

4,013,098

INLET PIPE

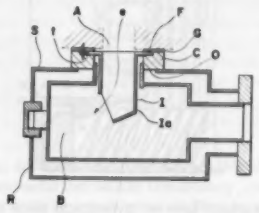
Tomoo Tadokoro, and Masayuki Kawata, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed May 19, 1975, Ser. No. 579,076

Claims priority, application Japan, May 22, 1974, 49-59099[U]

Int. Cl.² F16L *23/00;* **F01N** *3/10*

U.S. Cl. 138—106 **14 Claims**



1. In a combination of an inlet pipe connecting an exhaust outlet of an internal combustion engine, said exhaust outlet having a substantially flat, planar surface there surrounding, to an inlet of a thermal reactor which purifies the exhaust gases from said engine by thorough combustion of said exhaust gases therein, said inlet also having a substantially flat, planar surface there surrounding, an improved inlet pipe comprising:

a pipe member extending from said exhaust outlet of said engine into said thermal reactor through said inlet thereto; and

support means connected to said pipe member, positioned between and at least partially contacting said surface surrounding said exhaust outlet and said surface surrounding said inlet to said thermal reactor, for supporting said pipe member extended into said thermal reactor, said support means defining a circumferential support area in alignment with corresponding portions of said exhaust outlet surface and said inlet surface; said circumferential support area including a plurality of areas of reduced surface contact with said corresponding surface surrounding said inlet to said thermal reactor, whereby the surface area of said support means contacting said surface surrounding said inlet to said thermal reactor is reduced and the heat conducted from said support means to said exhaust outlet and said thermal reactor is reduced.

10. In a combination of an inlet pipe connecting an exhaust outlet of an internal combustion engine, said exhaust outlet having a substantially flat, planar surface theresurrounding, to an inlet of a thermal reactor which purifies the exhaust gases from said engine by thorough combustion of said exhaust gases therein, said inlet also having a substantially flat, planar surface theresurrounding, an improved inlet pipe comprising:

a pipe member extending from said exhaust outlet of said engine into said thermal reactor through said inlet thereto; and

support means connected to said pipe member, positioned between and contacting said surface surrounding said exhaust outlet and said surface surrounding said inlet to said thermal reactor, for supporting said pipe member extended into said thermal reactor, said support means having a plurality of openings therethrough.

4,013,099

SHEATHED TUBULAR STICK

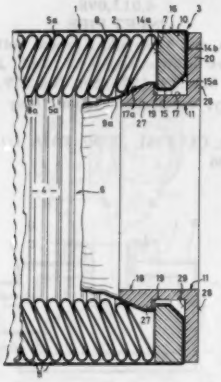
Günter Gerigk, Oberursel; Klaus-Jürgen Bittner, and Armin Köstner, both of Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed June 12, 1975, Ser. No. 586,224

Claims priority, application Germany, Mar. 12, 1975, 2510637

Int. Cl.² F16L 11/00

U.S. Cl. 138—109 15 Claims



1. In a sheathed, hollow, cylindrical stick composed of a flexible tube folded by longitudinal shirring,

the improvement comprising a cylindrical, flexible jacket means enveloping said stick and projecting over the ends thereof, parts of the projecting portions touching end walls of said stick with their inner sides,

annular disc means on said projecting portions,

and said projecting portions being inverted outwardly around said disc means in a manner such that the inner walls, the end surfaces and the outer walls of said disc means are tightly covered, and said inverted portions being parallel to said jacket means and close to the exterior thereof.

4,013,100

FLEXIBLE ELONGATED MEMBER COMPRISING A REINFORCING ARMOURING

Jean Thiery, Le Pecq; Michel Chatard, Chatou; Gerard Bonavent, Rueil-Malmaison, and Michel Huvey, Bougival, all of France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, France

Filed Nov. 27, 1973, Ser. No. 419,350

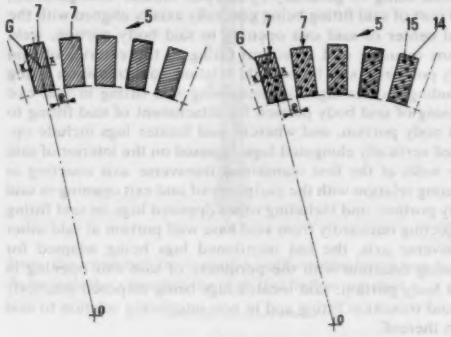
Claims priority, application France, Dec. 8, 1972, 72.43796; May 16, 1973, 73.17841

The portion of the term of this patent subsequent to Jan. 7, 1992, has been disclaimed.

Int. Cl.² F16L 11/10, 11/12, 11/16

U.S. Cl. 138—129 28 Claims

1. A flexible elongated member, having an axis of elongation and a substantially circular cross-section, including a reinforcing armouring capable of withstanding tractive and bending stresses applied to said elongated member, said armouring comprising at least one layer of elongated profiled metal rods, said metal rods being preformed to constitute helical windings having adjacent convolutions inclined with respect to said axis of elongation by an angle at most equal to 40°, each of said profiled rods having a configuration with a cross-section, said cross-section of said rod having a static centre of gravity and a moment of inertia with respect to a transverse axis of said cross-section of said profiled rods through said centre of gravity, said moment of inertia relative to said transverse axis of said cross-section being a maximum relative to all other axes passing through said centre of gravity, and each of said profiled rods being positioned on said flexible elongated member with said circular cross-section of said



elongated member having a radial direction passing through said centre of gravity of said cross-section of said rod perpendicular to said transverse axis, said adjacent convolutions being freely movable with respect to one another.

4,013,101

HOSE CONSTRUCTION

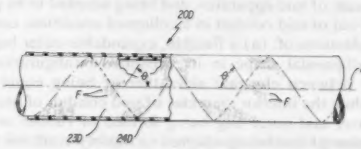
Arthur D. Logan, and James B. Rush, both of Waynesville, N.C., assignors to Dayco Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 452,471, March 18, 1974, Pat. No. 3,921,674. This application Nov. 18, 1975, Ser. No. 633,060

The portion of the term of this patent subsequent to Nov. 25, 1992, has been disclaimed.

Int. Cl.² F16L 11/08

U.S. Cl. 138—130 12 Claims

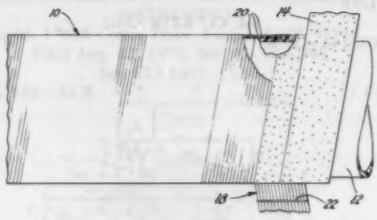


1. A hose construction having a fixed reference axis which extends in a curved path and comprising, a first layer portion made primarily of an elastomeric matrix material having randomly distributed elongated fibers embedded therein in substantially parallel relation, all of said fibers of said first layer portion extending in a helical pattern about said axis at a particular angle relative thereto, and a second layer portion bonded to said first layer portion as an integral part thereof, said second layer portion being made primarily of an elastomeric matrix material having randomly distributed elongated fibers embedded therein substantially in parallel relation, all of said fibers of said second layer portion also extending in a helical pattern about said axis at a particular angle relative thereto although in a direction opposite from the helical pattern of the fibers of said first layer portion, said fibers serving as the main reinforcement means for said hose construction.

4,013,102
COMPOSITE TUBING

John Z. DeLorean, Bloomfield Hills, and Chauncey L. Dirks, Metamora, both of Mich., assignors to John Z. DeLorean Corporation, Bloomfield Hills, Mich.

Filed Jan. 30, 1975, Ser. No. 545,683
Int. Cl.² F16L 59/00
U.S. Cl. 138—144 4 Claims

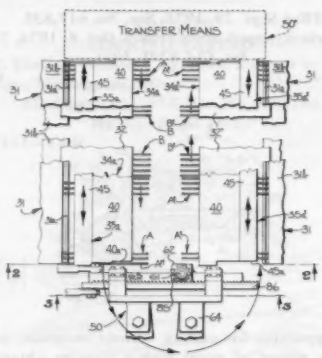


1. A composite rigid tubular structure comprising a rigidified tubular core member, a substantially compressed initially open-cell resilient foam material helically wrapped about said core element, a layer of reinforcing elements helically wrapped about said foam material, and a thermoset resinous matrix filling the compressed open-cells of said foam material and encapsulating said reinforcing elements.

4,013,103
TRIAXIAL WEAVING MACHINE WITH HEDDLE TRANSFER AND METHOD

Karol Kulczycki, Parsippany, N.J., and Burns Darsie, Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Aug. 11, 1975, Ser. No. 603,756
Int. Cl.² D03C 13/00
U.S. Cl. 139—11 31 Claims

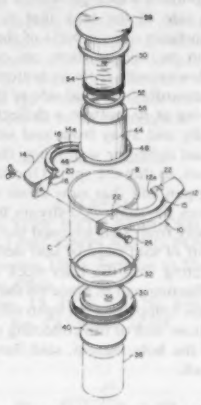


1. A weaving machine for making triaxial fabrics comprising a plurality of elongate heddles arranged in weftwise rows for guiding respective warp strands, warp strand supply means remote from said rows of heddles for directing warp strands thereto, means for longitudinally moving said heddles for forming the warp strands guided thereby into warp sheds, means for inserting wefts through warp sheds formed by the longitudinal movement of said heddles, means for shifting said heddles weftwise, and heddle transfer mechanism for engagingly receiving a heddle and for moving the same from one end of one row to the adjacent end of another row.

4,013,104
DISPENSER FOR SHORTENING OR THE LIKE

Ronald R. Sexton, Soldotna, Alaska, assignor to Daniel B. Sexton, Soldotna, Alaska, a part interest

Filed May 17, 1976, Ser. No. 686,921
Int. Cl.² B65B 3/10; B67D 5/64
U.S. Cl. 141—18 12 Claims



9. A dispenser for standard cans of vegetable shortening or the like of a semi-solid extrudible consistency, comprising,

pusher means centrally positioned on the can and having a central opening, pusher members extending laterally on the pusher means for pushing the can forcibly downward,

a push plate sealingly fitted within the bottom of the can for movement axially within the can,

cylinder means removably coupled to the pusher means for receiving shortening extruded by the push plate out of said central opening,

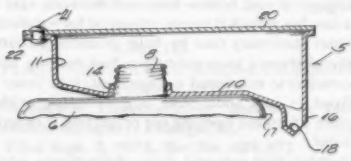
plunger means slidably mounted within said cylinder means for upward movement an amount corresponding to the amount of shortening extruded, and

base means of a transverse width less than said can but of a height greater than said can and seated against said push plate whereby downward pushing on said can against said base means moves said push plate upwardly relative to the can for extruding the shortening.

4,013,105
SPILLED FUEL DIVERTER FOR SMALL ENGINES

Arvo Foster Uuskallio, Colgate, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed June 9, 1975, Ser. No. 585,064
Int. Cl.² B65B 3/04, 39/00
U.S. Cl. 141—86 3 Claims



1. In combination:

A. an internal combustion engine having parts with exposed surfaces that become highly heated when the engine is in operation;

B. a fuel tank mounted on the body of the engine adjacent to its said exposed surfaces, said fuel tank having an upstanding filler neck on its top wall;

C. a collecting pan surrounding the filler neck and overlying the top of the fuel tank to catch fuel that spills alongside the filler neck during filling of the tank, said collecting pan

1. having a bottom wall with a hole therein through which the filler neck projects, said bottom wall having an upwardly projecting side wall extending entirely thereabout,

2. having a portion which projects a substantial distance beyond a side of the tank that is remote from said exposed surfaces of said parts of the engine, and

3. having, in its said portion, an outlet spout which projects downwardly from its bottom wall and which is spaced outwardly from said side of the tank, said outlet spout having at its bottom a deflector wall that slants downwardly and away from said side of the tank, the edge of said deflector wall being the bottommost part of the spout, so that the spilled fuel that is caught in the collecting pan and that runs down the interior of said spout leaves the same in a stream that is directed outwardly away from said exposed surfaces of the engine or drips off of said edge of said deflector wall; and

D. means coacting with the filler neck of the fuel tank to hold the collecting pan in place on the fuel tank, said last named means comprising an upstranding flange integral with the bottom wall of the collecting pan and rising from the edge of the hole therein, said flange tightly gripping the filler neck.

4,013,106

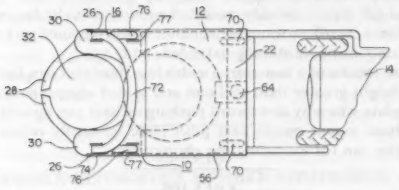
FLYWHEEL TREE FELLER AND BUNCHER

Alva Z. Albright, 2909 Monroe Hwy., Pineville, La. 71360

Filed Oct. 17, 1974, Ser. No. 515,767

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 R **6 Claims**



1. In tree harvesting apparatus, a flywheel tree feller and buncher comprising in combination:

a. a hollow base with forwardly extending arms defining an open forward end in said base;

b. a slide plate defining a similar forward opening in size to that in said base, said plate being adapted to slidably engage in said hollow base and between said arms;

c. a saw bar sprocket means mounted for rotation around an inner stationary race by balls mounted circumferentially therebetween to constitute a ball bearing with races in concentric rotational engagement, said inner race being fixed to said slide plate and eccentric with said slide plate's forward opening for projecting forwardly therebeyond;

d. combination saw and drive chain means adapted to engage said saw bar sprocket means for driving it in rotation with flywheel momentum to cut a tree when said slide plate slides forwardly for said forward openings in the base and slide plate to coincide;

e. buncher means fixed to said base to extend vertically thereabove with grapples for engaging and disengaging trees before and after cutting; and

f. hydraulic power means for operating said slide plate, saw and drive chain means, and said buncher means.

4,013,107

SAW BLADE AND FRET-SAW COMBINATION AND METHOD FOR USE THEREOF

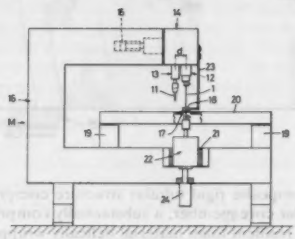
Ferdinand Steiger, and Werner Wahlen, both of Bern, Switzerland, assignors to Mapatex Establishment, Vaduz, Liechtenstein

Continuation-in-part of Ser. No. 511,771, Oct. 3, 1974, abandoned. This application Jan. 13, 1976, Ser. No. 648,634

Claims priority, application Switzerland, Oct. 12, 1973, 14551/73

Int. Cl.² B27B *33/02*

U.S. Cl. 144—35 R **6 Claims**



1. A saw blade in combination with a fret-saw; said fret-saw having means for clamping said blade substantially at its ends, said saw blade consisting essentially of two connected longitudinal sections having parallel sides of differing widths with each of said sections being toothed at the same one of said sides, the toothings for each of said sections being of substantially the same depths, the fret-saw further including means for selecting the cutting portion of said blade so that only one of said sections is cutting at any particular moment.

4,013,108

APPARATUS FOR CUTTING VARIOUS MATERIALS

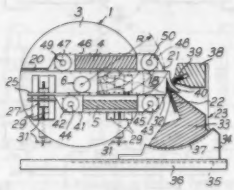
Jean Guillerm, Saint Maur, and Jacques Fondronnier, Creteil, both of France, assignors to Centre Technique du Bois, Paris, France

Filed Sept. 29, 1975, Ser. No. 617,835

Claims priority, application France, Oct. 8, 1974, 74.33860

Int. Cl.² B27L *5/00*

U.S. Cl. 144—175 **6 Claims**



1. An apparatus for cutting various materials and more particularly pieces of wood with a view to obtaining thin products of various thicknesses, comprising two pieces of equipment, on the one hand a cutting tool comprising a knife and a pressure bar, and on the other a support for receiving the material to be cut, said latter piece of equipment being mounted so as to pivot about a geometrical axis spaced from the cutting edge of the knife by a distance corresponding with the constant cutting radius selected and connected to a drive unit which gives to it a rotational movement in accordance with an amplitude at least equal to the angular opening of the material to be cut, the equipment supporting the material being also provided with a feed device operable to move the material towards the knife as a function of the thickness of the

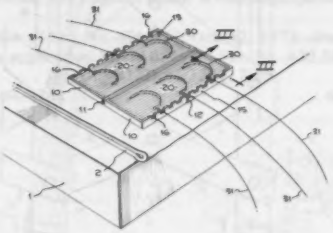
products to be cut, wherein this material supporting equipment is mounted from the cutting tool towards the geometrical pivoting axis the feed device of the supporting equipment being directed radially and the device having means for regulating the distance between the geometrical axis and the cutting edge.

4,013,109

DISPOSABLE CONTAINER FOR SURGICAL INSTRUMENTS

Dan Sandel, 17000 Cotter Place, Encino, Calif. 91316

Filed Aug. 22, 1975, Ser. No. 606,792
Int. Cl.² A61L *17/02*
U.S. Cl. 150—52 R **7 Claims**



1. In a hinged sterilizable disposable container for magnetizable instruments having relatively large upper and lower portions connected by sides of a relatively narrow dimension, the improvement comprising:

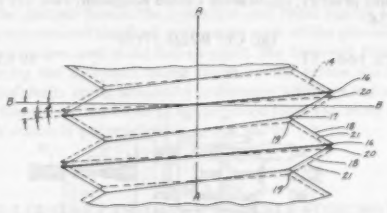
non-deformable case means for retaining said instruments entirely therewithin, said case means having upper and lower interior surfaces bounded by peripheral side wall means for enclosing the interior of said case means in a lateral direction when said upper and lower portions are hinged against each other, whereby any tendencies for said instruments to protrude through and therefrom are eliminated; and magnetic means attached to said lower interior surface of said case means for retaining any magnetizable instruments placed thereon.

4,013,110

LOCKING THREAD

Myron E. Darling, Webster City, Iowa, assignor to BJD Industries, Inc., Minneapolis, Minn.

Filed June 12, 1975, Ser. No. 586,184
Int. Cl.² F16B *39/22*
U.S. Cl. 151—14 R **9 Claims**



1. A locking thread comprising:

a first member having a helical thread formation comprising a plurality of convolutions about the outer periphery thereof, said thread formation having a crest and a root portion, said helical thread formation being formed about a longitudinal axis;

a second member having an opening therein, said opening having a helical thread formation comprising a plurality of convolutions about the inner periphery thereof formed about said longitudinal axis, said thread formation of said second member having a crest and a root portion;

one of said thread formations having a first helix angle which, in an unstressed condition, is substantially constant throughout at least one thread convolution;

the other of said thread formations having a helix angle which, in an unstressed condition, is substantially constant throughout at least one thread convolution and which differs from the first helix angle by a magnitude of between 39 and 85 percent of said first helix angle; and

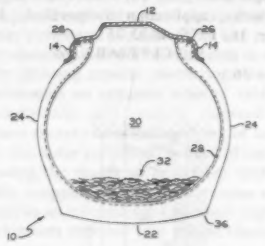
said helix angles being defined by the angle between a straight line projecting substantially along a portion of the crest of the respective thread formation and a plane which is perpendicular to said longitudinal axis; and, whereby said first member is adapted to be received in said opening of the second member thereby causing said thread formations to be in engagement.

4,013,111

PNEUMATIC TIRE WITH REDUCED RATE OF INFLATION LOSS UPON BEING PUNCTURED

Joe Allen Powell, Norton, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Dec. 15, 1975, Ser. No. 640,745
Int. Cl.² B60C *21/08*
U.S. Cl. 152—347 **10 Claims**



1. In a pneumatic tire having a casing, an annular, inner inflation chamber defined in part by said casing and means within said chamber to retard the rate of inflation loss upon puncture, the improvement wherein said means consists essentially of micro-cellular, discrete, loose fibers of synthetic, organic polymer composition, each of the fibers characterized by:

a. a plurality of closed, gas-filled cells;

b. substantially all of its polymer being present as thin, cellular walls, and

c. a density no greater than about 6 lb./cu. ft. (0.09 g./cc.), said fibers occupying from 0.5% to 10% of the inflation chamber's volume.

4,013,112

ANCHOR PLATE TIRE HAVING A SUB-LUG EQUIPPED ANCHOR PLATE

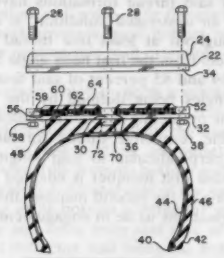
Aleksandar Vidakovic, Libertyville, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,472
Int. Cl.² B60C *27/20;* **B62D** *55/28*
U.S. Cl. 152—182 **3 Claims**

2. In combination with a unitized pneumatic tire having a carcass portion, a set of apertured anchor plates, and anchor plies, all formed, molded and cured as a unitized assembly, and a set of apertured traction plates for attaching to said anchor plates with bolts, the improvement comprising:

a sub-lug having a set of tapped apertures welded to the carcass contacting side of said anchor plate midway between the extreme ends of said anchor plate such that

attaching bolts passing through said traction plate and said anchor plate may be threadably engaged with the



tapped apertures of said sub-lug whereby said traction plate will be secured to said anchor plate.

4,013,113

FOLDABLE ROLLING SHUTTERS

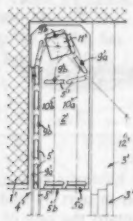
Paul Frei, Elgg, Switzerland, assignor to Griesser AG, Switzerland

Continuation of Ser. No. 592,902, July 3, 1975, abandoned. This application June 28, 1976, Ser. No. 700,338

Claims priority, application Switzerland, July 3, 1974, 9097/74; Apr. 16, 1975, 4833/75

Int. Cl.² E06B 9/26

U.S. Cl. 160—36 **15 Claims**



1. In a foldable rolling shutter including a curtain formed of elongated bars hinged to one another at longitudinal edges and guided at their ends in laterally spaced guide grooves, the improvement comprising, in combination, means, in an upper reversing zone, about which the rolling bar curtain is trained for direction reversal during raising and lowering; means forming a recess behind and below the reversing zone; and means effecting folding of the bar curtain within said recess under the weight of the curtain during raising of the curtain; said folding effecting means and said recess forming means conjointly guiding said bars to form at least one vertical pile of said hinged bars superposed in horizontal orientation in said recess.

4,013,114

ARTICULATED NETTING, PARTICULARLY FOR SHUTTERING

Klaus Karl-Heinz Goebel, 4, rue Leopold, 4650 Herve, Belgium

Continuation of Ser. No. 508,692, Sept. 23, 1974, abandoned. This application July 26, 1976, Ser. No. 708,687

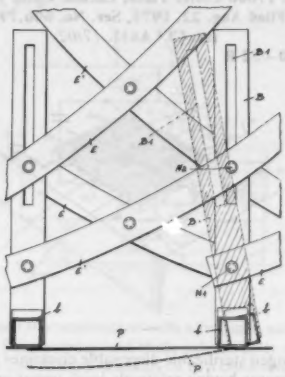
Claims priority, application Belgium, Sept. 25, 1973, 44318

Int. Cl.² A47H 1/00; E04H 12/18

U.S. Cl. 160—330 **1 Claim**

1. A lattice structure for shuttering comprising:

an annulus composed of two arrays of mutually crossing bars, each bar being in the form of a circular arc of the same predetermined radius of curvature, said bars having centers of curvature disposed at equal distances from one another along the circumference of an imaginary circle of the same radius, the bars of one array being curved in a direction opposite to that of the bars of the other array, pivots articulating the bars of both arrays at their crossover points, each of the pivots forming an articulation node, the articulation nodes being disposed along concentric circles and radii extending from the center of said concentric circles,



a plurality of relatively movable panels mounted on said bars along the outer periphery of the structure at respective articulation nodes,

a respective support bar for each of said panels pivotally connected to the respective articulation node and extending along a respective radius from said center of said concentric circles,

each of said bars being provided with a slot, and

an arcuate further bar forming part of the lattice structure at said outer periphery and having a pivot received in the respective slot.

4,013,115

METHOD OF DIE CASTING HIGH MELTING POINT METAL

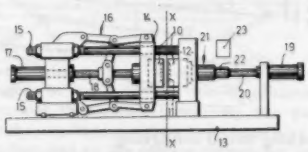
Roland George Ronald Sellors, Codsall, and Raymond Cooksey, Willenhall, both of England, assignors to G.K.N. Group Services Limited, Smethwick, England

Filed Feb. 20, 1975, Ser. No. 551,436

Claims priority, application United Kingdom, Feb. 27, 1974, 8795/74

Int. Cl.² B22D 17/30

U.S. Cl. 164—51 **10 Claims**



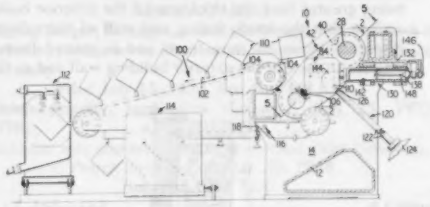
1. A method of die casting high melting point metal comprising the steps of introducing a solid charge into an electric induction furnace positioned above the receiving station of a shot duct which communicates with a die cavity defined between separable repeatedly useable dies; applying in a first stage of melting a minimum of 60% to a maximum of about 95 – 96% of the total heat input to the charge at a relatively high rate to partly melt the charge and subsequently, in a second stage of melting, starting prior to complete melting of the

charge, applying a reduced heat input ranging between a minimum of about 4 – 5% and a maximum of 40% of said total heat input to the charge at a reduced rate sufficient to maintain a small amount of turbulence in the molten metal insuring mixing of the charge and uniform temperature, the sum of said heat inputs being such as to insure an acceptable amount of super heat on pouring; causing the contents of the furnace to be discharged into the shot duct when the charge is completely molten and transferring the molten metal along the shot duct to introduce the molten metal into the die cavity under pressure.

4,013,116
DIE-CASTING MACHINE

Guido Perrella, 205 Edgehill Road, Westmount, Quebec, Canada

Continuation of Ser. No. 406,073, Oct. 12, 1973, abandoned. This application Nov. 10, 1975, Ser. No. 630,388
Int. Cl.² B22D *11/126, 17/26*
U.S. Cl. 164—262 **6 Claims**



1. A die-casting machine comprising a frame; a pair of spaced, parallel piston shafts mounted in said frame; a first pair of spaced, parallel cylinder assemblies mounted on one end of said pair of piston shafts; said first pair of assemblies supporting a mold half which is disposed therebetween, a second pair of spaced parallel cylinder assemblies mounted on the other ends of said pair of piston shafts and supporting a second mold half which is disposed therebetween, said parallel cylinder assemblies of said first pair being symetrically opposed to the parallel cylinder assemblies of said second pair; each of said cylinder assemblies of the two pairs thereof comprising (a) a stationary piston secured to one of the piston shafts on the frame and being coaxial therewith (b) said shaft extending across to a connection with an opposed piston of the other pair; and (c) a cylinder mounted on the piston and shaft for reciprocal movement thereon in response to incompressible fluid injected therein on either side of said piston; whereby injection of fluid into the cylinders at the crown ends of the pistons forces the cylinders and mold halves together and injection of the fluid at the skirt ends of the pistons forces the cylinders and mold halves apart; the terminal force from opening the cylinders being taken by the piston shafts; said piston shafts being spaced by a distance which permits a casting formed by the mold to be removed from the mold along a path which is perpendicular to the shafts.

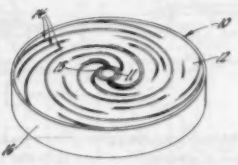
4,013,117
MULTI-START INVOLUTE REGENERATOR MATRIX DISK AND METHOD OF ASSEMBLING SAME

Nikolaus Kopetzki, Sterling Heights, and Petro Mykolenko, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 6, 1976, Ser. No. 655,726
Int. Cl.² F28D *19/00*
U.S. Cl. 165—10 **6 Claims**

1. A regenerator matrix structure including a central hub mandrel, a plurality of matrix elements, each said matrix element having one end thereof in abutment against said hub mandrel and being spirally wound in involute configuration about said hub mandrel, each of said matrix elements including in series a chevron strip and a separator strip extending along one side of the chevron strip and, a pair of pinch rings encircling said hub mandrel on opposite sides thereof with each of said pinch rings being embedded into the edges of said matrix elements whereby to wedge said matrix elements against said hub mandrel, said matrix elements, said pinch rings and said hub mandrel being further bonded together into a rigid elastic structure integral with said hub mandrel.

3. A method of assembling a multi-start involute regenerator matrix disk having a hub mandrel means and a plurality of matrix elements, said method including the steps of providing a magnetic field on the peripheral surface of said hub mandrel, feeding matrix elements into endwise abutment against the

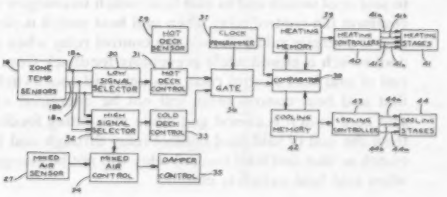


outer peripheral surface of said hub mandrel means to be retained magnetically thereto, said matrix elements being positioned in parallel spaced apart relationship to each other about the outer peripheral surface of said hub mandrel means, mechanically securing said matrix elements to said hub mandrel means by pressing annular pinch rings into the edges of said matrix elements on opposite sides of said hub mandrel means, concentrically and radially outward thereof and closely adjacent thereto to effect wedging of said matrix elements against the outer peripheral surface of said hub mandrel means, removing the magnetic field from said hub mandrel means, spirally wrapping said matrix elements about said hub mandrel means in an involute configuration and then bonding said matrix elements together into a rigid elastic structure.

4,013,118
CONTROL OF HEATING AND COOLING AVAILABLE FROM CENTRAL SOURCES TO A MULTI-ZONE TEMPERATURE CONTROLLED SPACE

Darrel E. Zimmer, North Park, and Paul H. Brace, Rockford, both of Ill., assignors to Barber-Colman Company, Rockford, Ill.

Division of Ser. No. 470,567, May 16, 1974, Pat. No. 3,933,197. This application Nov. 19, 1975, Ser. No. 633,432
Int. Cl.² F24F *3/00*
U.S. Cl. 165—22 **10 Claims**



1. In a system for automatically controlling the amount of heating and cooling available from a central location to a plurality of temperature controlled zones having different heating and cooling demands, in combination means for providing signals representative of the heating and cooling demands of the zones, a gate alternately passing said heating and cooling demand signals to provide a signal demand signal, a comparator providing heating and cooling references and comparing said single demand signal with said heating and

cooling references in synchronism with the passage of said heating and cooling demand signals by the gate, a heating controller controlling the amount of heating available in response to the result of said heating signal comparison, and a cooling controller controlling the amount of cooling available in response to the result of said cooling signal comparison.

4,013,119

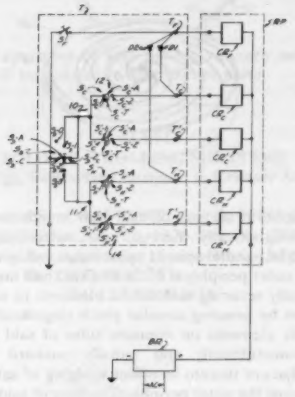
AIR CONDITIONER CONTROL SYSTEM

Preston A. Wallace, 6000 Park Ave. 6F, Atlanta, Ga. 30342

Filed Dec. 15, 1975, Ser. No. 640,833

Int. Cl.[2] G05D *23/19*

U.S. Cl. 165—27 **4 Claims**



1. A control system for controlling the operation of an air conditioning system having a heating mode capability, a cooling mode capability, and a common air distribution fan motor comprising:

a thermostatically operated heat switch;

a thermostatically operated cool switch;

a common fan motor control relay for operating the system fan motor;

a cool control relay for operating the system in the cool mode, the coil of said cool control relay connected to said cool switch to energize said cool control relay upon closure of said cool switch;

a heat control relay for operating the system in the heat mode; the coil of said heat control relay connected to said heat switch to energize said heat control relay upon closure of said heat switch; and,

a diode network connecting the coil of said fan control relay to said cool switch and to said heat switch to energize said common fan control relay when said heat switch is closed and to energize said common fan control relay when said cool switch is closed while preventing feedback from the coil of said heat control relay through said cool switch so that said heat control relay will not be energized when said cool switch is closed and while preventing feedback from the coil of said cool control relay through said heat switch so that said cool control relay will not be energized when said heat switch is closed.

4,013,120

AIR CONDITIONER

Martin Rheinheimer, 190 Wentworth, Glencoe, Ill. 60022

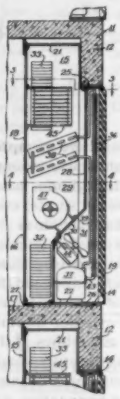
Continuation of Ser. No. 435,286, Jan. 21, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 606,174

Int. Cl.[2] F25B *29/00*; **F24H** *9/08*

U.S. Cl. 165—48 **3 Claims**

1. An improved self contained air conditioning unit for heating and cooling the air in at least one room of an apartment building, small office building, townhouse or the like and adapted for heating and cooling the air in a room adjacent to the one room wherein independent temperature control is desired for heating and cooling the air and wherein the exterior building wall of the one room comprises floor to ceiling glass or windows except for a vertically elongated, generally rectangular, relatively narrow opening which is disposed adjacent to and along the side of the glass or windows, and which extends vertically from adjacent to the floor to adjacent to the ceiling in the one room, the improved air conditioning unit comprising:

a vertically elongated, generally rectangular cabinet including a vertically elongated, relatively narrow outside facing end wall, a vertically elongated, relatively narrow inside facing end wall, relatively narrow top and bottom walls, and two relatively wide side walls, with at least a portion of the cabinet adapted to be disposed in the opening in the exterior building wall such that the outside facing end wall of the cabinet is in communication with the exterior of the building and is substantially flush with the exterior surface of the exterior building wall, with the distance between the outside facing and inside facing end walls being greater than the thickness of the exterior building wall so that the inside facing end wall of the cabinet is disposed within the one room and is spaced from the interior surface of the exterior building wall and so that a



substantial portion of at least one of the side walls of the cabinet is disposed within the one room and projects inwardly from the interior surface of the exterior building wall, and with the top and bottom walls of the cabinet being adjacent to the ceiling and floor of the one room;

a generally vertical wall extending between the side walls of the cabinet and dividing the cabinet into an outside compartment and an inside compartment, with the generally vertical wall preventing air communication between the inside and outside compartment;

an outside fresh air opening mounted in the outside facing end wall of the cabinet so as to permit fresh air communication between the outside compartment and the exterior of the building with the outside fresh air opening extending substantially the entire vertical length of the outside facing end wall;

a return register opening mounted in the substantial portion of one of the side walls of the cabinet and adjacent to the bottom wall of the cabinet so as to permit return air from the interior of the room ingress to the inside compartment;

a supply register opening mounted in the substantial portion of one of the side walls of the cabinet and adjacent to the top wall of the cabinet so as to permit conditioned air egress from the inside compartment to the interior of the one room, with the return register opening, the supply

register opening and the inside compartment being arranged such that air will flow from the return register opening, through the inside compartment and out the supply register opening along a predetermined, generally vertical air path;

means for cooling the air flowing along the predetermined air path and disposed entirely within the cabinet, the cooling means including interconnected compressor means, evaporator means and condenser means, with the evaporator means being disposed in the inside compartment in the predetermined air path and the condenser means being disposed in the outside compartment adjacent to the outside fresh air opening; and

air blower means mounted in the inside compartment for drawing air into the inside compartment through the return register opening and blowing the air along the predetermined path, across the evaporator means and out of the inside compartment through the supply register opening.

4,013,121

STEAM GENERATOR, TUBE-BUNDLE CENTERING ARRANGEMENT

Wolfgang Berger, Erlangen, and Hans Rottger, Weiher, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

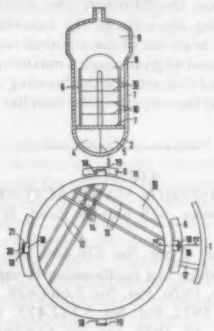
Filed July 15, 1974, Ser. No. 488,836

Claims priority, application Germany, July 25, 1973, 2337791

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² F28F *9/00*

U.S. Cl. 165—162 **4 Claims**



1. A steam generator having a tube sheet, a heat-exchanger tube bundle having ends mounted in said tube sheet and extending from said tube sheet, a cylindrical wall surrounding said tube bundle, at least one tube bundle tube spacer grid having a ring encircling said bundle inside of said cylindrical wall, and means for connecting said ring to said wall; wherein the improvement comprises said means being in the form of keys and keyways extending radially with respect to said ring and wall and relatively sliding longitudinally with respect to said tube bundle and wall when said ring and said wall thermally move relative to each other, while locking said ring non-rotatively relative to said wall.

4,013,122

DIVER'S GAS HEATER

Richard William Long, 760 Wakefield Court, San Diego, Calif. 92020

Filed May 5, 1975, Ser. No. 574,253

Int. Cl.² F28D *7/10*

U.S. Cl. 165—154 **5 Claims**

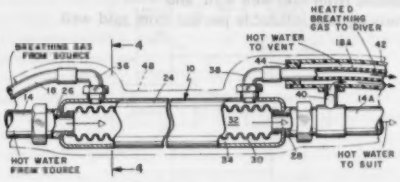
1. A breathing gas heater for use with a hot water heated diver's suit, comprising:

a hot water heated diver's suit,

an elongated tubular casing having a water inlet at one end with means for connection to a source of hot water, and a water outlet at the other end with means for connection to a diver's suit,

an inner heat conducting tube fixed in said casing between said inlet and outlet and defining a central water conducting channel and an outer gas conducting annulus,

a gas inlet in said casing adjacent said water inlet, opening into said annulus and having means for connection to a source of breathing gas,



a gas outlet in said casing adjacent said water outlet, opening from said annulus and having diver's suit connection means for connection to the diver's suit,

said diver's suit connection means comprises a gas extension hose attached to said gas outlet and extending to the diver's suit,

a jacket surrounding and coextensive with said extension hose,

and means for conducting hot water from the heater unit into said jacket.

4,013,123

HYDRAULICALLY ACTUATED WIRE LINE APPARATUS

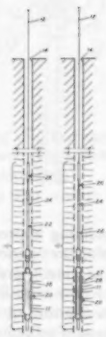
Neal L. Mitchell, Taft, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 510,260, Sept. 30, 1974. This application May 8, 1975, Ser. No. 575,761

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.² E21B *47/00, 47/10*

U.S. Cl. 166—250 **1 Claim**



1. The method of obtaining impression information from a well comprising:

flowing a noncompressible liquid through an orifice,

running into a well a wire line packer having an impression sleeve connected to the outside of an inflatable sleeve of said packer,

lowering said inflatable packer down said well before the

elapse of a predetermined time as determined by flow of said liquid through said orifice to position the impression sleeve at a predetermined depth in said well,

inflating said inflatable sleeve of said packer in response to said flow of liquid through said orifice to press said impression sleeve against the wall of said well,

maintaining said inflatable sleeve in inflated condition for a predetermined time while continuing to flow said liquid through said orifice,

then in response to said flow of said liquid deflating the inflatable sleeve of said packer to remove said impression sleeve from said well wall, and

removing said inflatable packer from said well.

4,013,124

METHOD FOR OBTAINING INFORMATION FROM A WELL BY USE OF A GAS OPERATED HYDRAULICALLY ACTUATED WIRE LINE PACKER

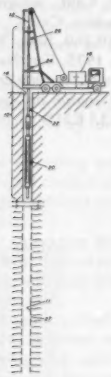
Stanley O. Hutchison, Bakersfield, and Neal L. Mitchell, Taft, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 510,264, Sept. 30, 1974. This application May 8, 1975, Ser. No. 575,776

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976

Int. Cl.² E21B *47/00, 47/10*

U.S. Cl. 166—250 **1 Claim**



1. The method of obtaining impression information from a well comprising activating an operating gas and causing said operating gas to flow a noncompressible liquid through an orifice, running into a well a wire line packer having an impression sleeve connected to the outside of an inflatable sleeve of said packer, lowering said inflatable packer down said well before the elapse of a predetermined time as determined by flow of said liquid through said orifice to position the impression sleeve at a predetermined depth in said well, inflating said inflatable sleeve of said packer in response to said flow of liquid through said orifice to press said impression sleeve against the wall of said well, maintaining said inflatable sleeve in inflated condition for a predetermined time while continuing to flow said liquid through said orifice, then in response to said flow of said liquid deflating the inflatable sleeve of said packer to remove said impression sleeve from said well wall and removing said inflatable packer from said well.

4,013,125

FLOODING WITH MICELLAR DISPERSIONS CONTAINING PETROLEUM SULFONATES OBTAINED BY SULFONATING WHOLE OR TOPPED CRUDE OIL

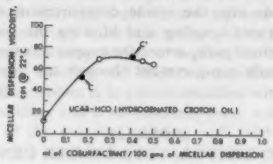
Mark A. Plummer; Donald E. Schroeder, Jr., and Wayne O. Roszelle, all of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Mar. 27, 1975, Ser. No. 562,519

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² E21B *43/22*

U.S. Cl. 166—273 **14 Claims**



"VISCOSITY vs. COSURFACTANT ADDITION FOR MICELLAR DISPERSION USED IN EXAMPLE II."

1. In a process of recovering hydrocarbon from a subterranean formation having at least one injection means in fluid communication with at least one production means and wherein a micellar dispersion comprised of water, hydrocarbon, cosurfactant, electrolyte and petroleum sulfonate obtained by sulfonating whole or topped crude oil is injected into the formation and displaced toward the production means to recover hydrocarbon therethrough, the improvement comprising incorporating amounts of the cosurfactant into the micellar dispersion in excess of the amounts required to cause the micellar dispersion to go through a maximum viscosity and to establish a desired viscosity for the flooding of the subterranean formation, and then injecting the micellar dispersion into the formation.

4,013,126

HORSESHOE MANUFACTURE

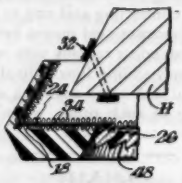
Dudley W. C. Spencer, 619 Shipley Road, Wilmington, Del. 19801

Continuation-in-part of Ser. No. 426,446, Dec. 20, 1973, Pat. No. 3,917,000, which is a continuation-in-part of Ser. No. 71,121, Sept. 10, 1970, Pat. No. 3,664,428, and Ser. No. 252,546, May 12, 1972, Pat. No. 3,782,473. This application Sept. 18, 1975, Ser. No. 614,766

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² A01L *3/00*

U.S. Cl. 168—4 **11 Claims**



1. A horseshoe assembly comprising a shoe element, said shoe element having a body member with a lower wear surface and an upper securing surface, said shoe element being generally U-shaped to conform to the shape of a hoof, adhesive means on said shoe element, hoof-threading means for being threaded through holes in a hoof of a horse, said hoof-threading means including an elongated strand made of a flexible

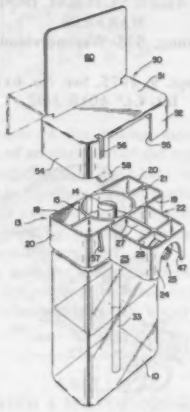
lace-type material for being in direct contact with said adhesive means to thereby secure said assembly to the hoof, and said strand being formed of an open material having a substantial number of exposed air spaces whereby the adhesive means may flow into said air spaces for intimate securement of said assembly to the hoof.

4,013,127

FIRE EXTINGUISHER PACKAGE FOR WASTE RECEPTACLE

Kenneth S. Tenney, and Michael A. Roby, both of Winchester, Va., assignors to Rubbermaid Commercial Products, Inc., Winchester, Va.

Filed Jan. 22, 1975, Ser. No. 543,022
Int. Cl.² A62C *35/10*
U.S. Cl. 169—57 **10 Claims**



1. A fire extinguisher assembly adapted for attachment to the upper rim of a waste receptacle comprising, a see-through plastic container for fire extinguisher liquid, a shroud member surrounding one end of the container and sealing the container, a heat-activated valve mounted in said shroud laterally of the container and normally closing said container for discharging extinguisher liquid therefrom at a predetermined temperature and in a predetermined direction, and means for releasably attaching said container to the upper rim of a waste receptacle, said plastic container adapted to soften and perforate at a temperature slightly greater than that required to open the valve.

4,013,128

MODULAR FIRE PROTECTION SYSTEM

Robert F. Davis, Framingham, Mass., assignor to Walter Kidde & Company, Inc., Clifton, N.J.

Filed Apr. 19, 1976, Ser. No. 677,916
Int. Cl.² A62C *37/04*, *35/08*
U.S. Cl. 169—61 **10 Claims**

1. An electrical protection system comprising:

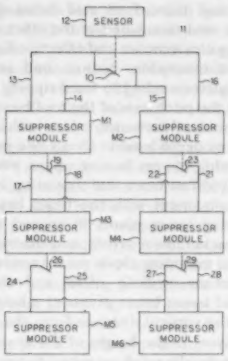
a plurality of suppressor modules, each of said modules comprising a plurality of suppressor units activatable to suppress an abnormal condition,

an activator associated with each of said units and energizable by a given level of electrical current flow to induce activation thereof,

series circuit means connecting said activators in series, and an initiator circuit activatable to induce said given level of electrical current flow to said activators;

detector means for sensing the abnormal condition and activating said initiator circuits in a first plurality of said modules in response thereto; and

response means for activating said initiator circuits in another plurality of said modules in response to activation



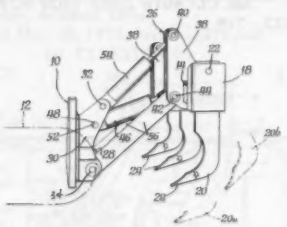
of said initiator circuits in any of said first plurality of modules.

4,013,129

RIPPER FOR ATTACHMENT TO TRACTOR

John R. Wilkinson, Arlington Heights, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Sept. 24, 1975, Ser. No. 616,457
Int. Cl.² A01B *13/08*, *63/102*
U.S. Cl. 172—464 **5 Claims**



1. Means for supporting shanked ripper means from a tractor, so as to rip with remotely-adjustable pitch and depth actuation, said means comprising:

mounting clevis means and towers for attachment to the rear of the tractor;

a shank holding, horizontal tool beam spaced rearwardly from said mounting clevis means and tower and having at least a central shank holder, and provided at the front thereof with inner clevis means integral with the central shank holder of the tool beam, which clevis means includes a pivot spaced just forwardly of said tool beam, said tool beam also being provided with vertically disposed, outer beam brackets, said brackets each having an upper pivot outwardly and upwardly offset from said beam-shank-holder clevis means and a lower pivot outwardly offset from, and together with, said pivot of said beam-shank-holder clevis means mutually defining a coaxis, said coaxis being spaced just forwardly of said tool beam;

said mounting clevis means being in spaced alignment with the beam-shank-holder clevis means forwardly of the tool beam;

means for operatively directly connecting the tool beam to the rear of the tractor comprising hydraulic depth actuator means in direct alignment with the tool beam in the space in which said mounting and beam-shank-holder clevis means are in alignment and connected in said space at one end thereof to said beam-shank-holder clevis means at said coaxis and at the other end thereof to said mounting clevis means and effective for both foreshortenable and extensible motion, and immobility at fixed lengths corresponding to fixed ripping depths; said coaxis defining the pitch axis of the tool beam whereat the connected-on depth actuator means with its aforesaid motion introduces depth load in direct line into the tool beam;

said mounting towers having upper pivots outwardly and upwardly offset from said mounting clevis means and in spaced alignment with the beam bracket upper pivots, and having lower pivots in spaced alignment with the beam bracket lower pivots, and spaced apart in directions from said mounting clevis means rendering said mounting clevis means medially offset and also offset upwardly from said tower lower pivots at a height at least a major part of the vertical distance from the height of the tower lower pivots to the height of the tower upper pivots;

a pair of hydraulic pitch actuators between the upper pivots of the respective mounting towers and beam brackets effectively connected for foreshortenable and extensible movement conjointly, and immobility at fixed lengths corresponding to fixed ripping pitches; and

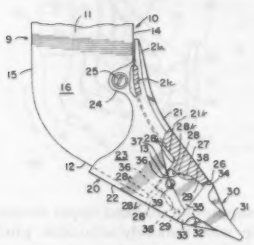
fixed-predetern ined-length link means operatively directly connecting the tool beam to the rear of the tractor comprising a pair of draft links between the lower pivots of the respective mounting towers and beam brackets.

4,013,130

RIPPER TIP ASSEMBLY

Leon A. Wirt, Joliet, and Kenneth A. Rhoads, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 4, 1974, Ser. No. 520,241
Int. Cl.² A01B *23/02*; E02F *9/28*
U.S. Cl. 172—719 **30 Claims**



1. In an earthworking apparatus, a ripper assembly comprising, in combination:

a first element comprising a ripper shank which has an upper portion and a tapered, forwardly projecting lower end portion which has front and rear faces and side faces, said lower end portion having a first transverse surface providing a blunt lower extremity;

a second element comprising a detachable hollow shin protector which has front and rear walls and side walls which closely embrace and reinforce the tapered lower end portion of the shank, said second element having a lower end portion with a second transverse surface adjacent said first tranverse surface;

a third element comprising a one-piece detachable ripper tip which includes a forward ripper portion, a ripper tip base immediately adjacent the lower end of the shin protector forward of the blunt extremity of the shank, said base having an external flange providing a peripheral shoulder with a generally planar upper surface the perimeter of which substantially matches the perimeter of said lower end of the shin protector, and a mounting stub which is substantially rectangular in cross section and extends rearwardly from said base and is smaller in cross section than the base, said mounting stub being provided with a longitudinal forward external control surface and a longitudinal rearward external control surface each of which abuts a mating internal surface of at least one of said first and second elements of the combination to position the ripper tip and transmit ripping forces from the tip into the shank and the shin protector;

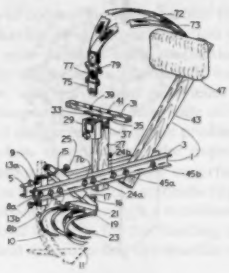
means detachably securing the shin protector to the shank; and means detachably positioning the ripper tip with reference to the shank and the shin protector.

4,013,131

WALKING TYPE AGRICULTURAL IMPLEMENT WITH HARNESS

Bernard C. Armstrong, 535 Westmoreland, Jackson, Tenn. 38301

Filed Sept. 9, 1975, Ser. No. 611,671
Int. Cl.² A01B *3/02*
U.S. Cl. 172—370 **8 Claims**



1. An agricultural implement of the walking type comprising:

an elongated body member, said member receiving a downwardly extending cultivating member attached thereto at one end thereof said cultivating member including a support means extending downwardly from said body member and supporting at least one blade element adjacent the bottom end thereof, wherein said blade element includes a surface tapered to a point forming a cutting edge for loosening or breaking up soil, an upwardly extending body support assembly also received by said member and attached thereto at the opposed end thereof, and a handle means attached to and received by said member, said handle means being positioned between said cultivating member and said body support member intermediate the length of said member, harness means attached at one end thereof to said body support member and at the other end thereof to said handle means, said harness means including a belt, said belt being provided with means for hitching an operator therein.

4,013,132

DEVICE FOR SUPPORTING BULLDOZER BLADE

Kunihiko Matsuzawa, Sagamihara, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1975, Ser. No. 645,453
Claims priority, application Japan, Jan. 6, 1975, 50-18; July 21, 1975, 50-88413
Int. Cl.² E02F *3/76*
U.S. Cl. 172—804 **4 Claims**

1. A device for supporting a blade on a bulldozer, comprising:

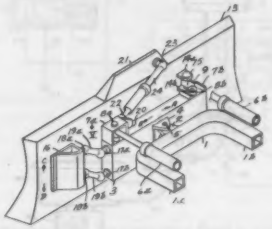
a subframe adapted to be supported by a frame of the bulldozer for limited pivotal movement relative to the frame, about a vertical axis;

first hydraulic cylinder means securable to the bulldozer and secured to the subframe for causing said pivotal movement of the subframe;

a blade disposed in front of the subframe;

universal joint means connecting one side of the subframe to one side of the blade;

a pair of linking means each having spherical joints on each



end thereof, one of the linking means connecting an upper portion of another end of the subframe to an upper portion of another end of the blade and the other of the linking means connecting a lower portion of the other end of the subframe to a lower portion of the other end of the blade, for permitting limited movement of the blade relative to the subframe; and

second hydraulic cylinder means connected to the subframe and the blade for causing the blade to move substantially in the vertical direction pivotally about the universal joint means.

4,013,133

APPARATUS WITH A MOTOR-DRIVEN MATERIAL REMOVING TOOL, ESPECIALLY FOR CUTTING CONCRETE, STONE OR THE LIKE

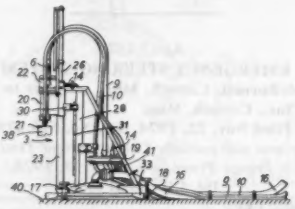
Hans Bieri, Toedistrasse 9, 8330 Pfaeffikon, Switzerland

Continuation of Ser. No. 462,801, April 22, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,633

The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.² B23B *45/04, 45/14;* **E21C** *11/00*

U.S. Cl. 173—32 **4 Claims**



1. An apparatus for cutting concrete, stone or the like, comprising a transportable tool group including power driven tool means, a transportable reduced pressure and control group, and a transportable power drive group, said transportable tool group being adapted for the temporary attachment of said power driven tool means to work surface of any inclination including the horizontal and the vertical, said three groups being spaced apart, interconnectable and disconnectable from each other, said transportable tool group (3) comprising a rigid suction bell having a rim, a bearing surface on said rim adapted to face said work surface, a vacuum connection opening in said bell for evacuation of said bell, tool holding means for holding said power driven tool means, means for affixing said tool holding means in a rigid manner to said bell, said tool holding means comprising means for holding said power driven tool means laterally adjacent only one side of said bell, elastic sealing means on said bearing surface for sealingly engaging said work surface, and at least three supporting means rigidly affixed to said suction bell and extending beyond said bearing surface in a direction to space said bearing surface from said work surface whereby the deformation of said sealing means is precisely limited during the entire duration of said evacuation, said transportable tool group further including a drive motor (22) for driving said power driven tool means, and a feed advance unit (26) for said power driven tool means, said transportable reduced pressure producing and control group (2) including reduced pressure producing means (39) and control means (29, 34) for controlling the power supplied to said drive motor (22) and to said feed advance unit (26), and flexible as well as disconnectable fluid lines including pressure line means connectable to said motor and further including suction line means connectable to said suction bell for evacuating the latter, said transportable power drive group (1) comprising at least one motor and at least one pressure pump driven by said motor, at least two pressure lines and at least one electric cable for connecting the power drive group to said reduced pressure producing and control group, whereby said tool group is separately transportable from said reduced pressure producing and control group and also separately transportable from said power drive group.

4,013,134

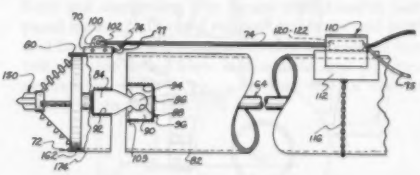
PORTABLE EARTH BORING MACHINE WITH STEERING HEAD

Albert R. Richmond, West Salem, and William S. Appleman, Ashland, both of Ohio, assignors to The Richmond Manufacturing Company, Ashland, Ohio

Filed May 20, 1974, Ser. No. 471,440

Int. Cl.² E21B *7/06*

U.S. Cl. 175—73 **14 Claims**

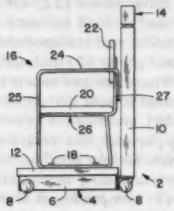


1. In an earth boring apparatus of the type that forms horizontal holes and pushes sections of casing into said holes, the combination of casing means including a lead casing section including a first longitudinal axis; a second casing section rearwardly adjacent to said lead casing section and including a longitudinal axis normally aligned with said first longitudinal axis; auger means mounted co-axially within said casing sections for removing earth in the path of movement of the casing sections; pivot means connecting said lead casing section to said second casing section; actuating means connected to said lead casing section for varying the angle of said first longitudinal axis of said lead casing section relative to said second longitudinal axis of said second casing section, said angle variation of said lead casing section being affected independently wiith respect to said auger means, said actuating means comprising an actuating rod extending along the walls of said casing sections and including an inner end connected to said lead casing section and an outer end; and a motor connected to said outer end of said actuating rod for extending and retracting said rod.

4,013,135
APPARATUS FOR SUPPORTING AND WEIGHING PATIENTS IN A SITTING POSITION

Raymond O. Kechely, 2635 Tamalpais Drive, Pinole, Calif. 94564

Filed Dec. 29, 1975, Ser. No. 644,397
Int. Cl.² G01G *19/52, 19/00;* B60N *1/06*
U.S. Cl. 177—144 9 Claims

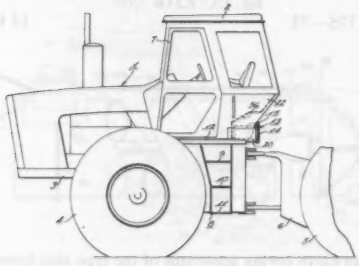


1. Apparatus for weighing a patient in a sitting position comprising a scale, a chair attached to the scale, an arm rest mounted to the chair for supporting the patient, and means for pivotally moving the arm rest between a closed position and an open position about a substantially upright axis through approximately 180°

4,013,136
BATTERY MOUNT

James R. Fear, Greenfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 10, 1975, Ser. No. 630,742
Int. Cl.² B60R *18/02*
U.S. Cl. 180—68.5 10 Claims

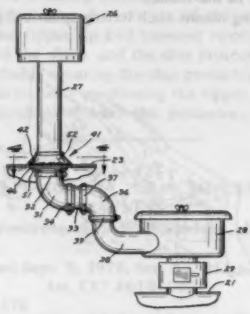


1. A battery servicing device including pivotal battery mount for use on a vehicle comprising, a vehicle chassis, a cab mounted on said vehicle chassis, said cab defining a recessed portion on its lower rear side, a battery tray for supporting at least one battery, pivotal support means defining a vertical pivotal axis on one side of said chassis to the rear of said cab including a bracket mounted on said vehicle pivotally supporting said battery tray in the recessed portion across said cab in the operating position and permitting pivotal movement to a position extending laterally from said cab for servicing, a tray support mounted on said vehicle in spaced relation to said pivotal support means for support of a portion of said battery tray in its operating position, a latch connected between said tray support and said battery tray for latching said tray in the operating position, retainer means on said tray for retaining batteries on said tray, a cab access ladder on said one side of said chassis for gaining access to said cab and for servicing said battery when said battery is pivoted to the said one side of said cab.

4,013,137
ENGINE AIR INTAKE SYSTEM

Ross K. Petersen, 2974 W. River Road, Minneapolis, Minn. 55406

Filed Apr. 25, 1975, Ser. No. 571,584
Int. Cl.² B62D *25/00*
U.S. Cl. 180—69 R 6 Claims



1. An air cleaning structure for use with a vehicle having a hood with an opening and an internal combustion engine having an air intake manifold comprising: an air cleaner connected to the air intake manifold to provide clean air for the engine, a generally upright tubular stack extended through the opening in the hood, said stack having an upper end above the hood and a lower end below the hood, an air precleaner mounted on the upper end of the stack operable to separate particulate matter from the air and direct clean air into the stack, tubular means secured to the lower end of the stack and the air cleaner connecting the stack to the air cleaner, mount means securing the stack to the hood, said mount means including a generally rectangular and flat first plate located above the hood, said first plate having a hole for accommodating the stack whereby the first plate is located around the stack, means securing the first plate to the stack to fix the position of the first plate on the stack, a generally rectangular and flat second plate located below the hood, said second plate having a hole for accommodating the stack whereby the second plate is located around the stack, and fastening means connecting the corner portions of the first plate with the corner portions of the second plate and the plates to the hood thereby mounting the stack in a fixed position on the hood.

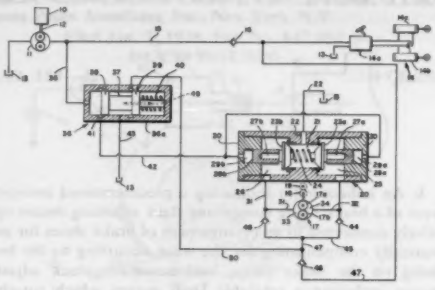
4,013,138
EMERGENCY STEERING SYSTEM

James R. McBurnett, Corinth, Miss., assignor to Tyrone Hydraulics, Inc., Corinth, Miss.

Filed Nov. 22, 1974, Ser. No. 526,279
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976
Int. Cl.² B62D *5/06*
U.S. Cl. 180—133 9 Claims

1. An emergency control system for use in a reversibly operable vehicle having a hydraulically operated steering system, including reservoir means for a supply of operating fluid for said steering system and a first pump adapted to be operated by the vehicle prime mover for supplying the steering system with operating fluid when the prime mover is in operation, said emergency control system comprising; a second pump adapted to be reversibly operated according to the direction of operation of the vehicle, first and second chambers at opposite sides of said second pump serving alternately as suction and discharge chambers according to the direction of operation of said second pump, valve means for interconnecting said reservoir with said chambers comprising first and second passageways for supply of fluid from said reservoir

means to said first and second chambers respectively, a valve member in each of said passageways, said valve members each being movable between a position in which flow from the reservoir to its chamber is blocked and a position in which flow is permitted, control means responsive to operation of said first pump for holding said valve members in the flow



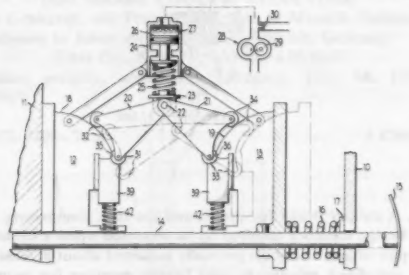
blocking position so that no operating fluid is delivered to the second pump when the first pump is operating, said control means being operative to open the valve member blocking flow to the chamber serving as suction chamber when the first pump is not in operation and the vehicle is in motion whereby operating fluid is delivered by said second pump to said steering system when the first pump is not operating.

4,013,139

VEHICLE BUMPER ASSEMBLY

James Hrebicek, 2327 S. 61st Ave., Cicero, Ill. 60650

Filed Aug. 7, 1975, Ser. No. 602,632
Int. Cl.² B60R *19/02*
U.S. Cl. 180—108 **3 Claims**



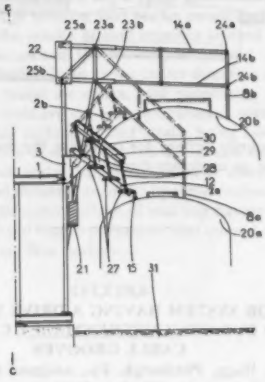
1. A vehicle bumper assembly comprising an abutment on the exterior of the vehicle, a support on the vehicle for slidably holding the abutment on the vehicle, and continuously operable means for moving said support relative to the vehicle to change the location of the abutment relative to the vehicle, said means comprising fluid pressure means, a pump for pressuring the liquid pressure means, means driving the pump in timed relation to the speed of the vehicle to vary the pressure of the fluid in accordance with the speed of the vehicle, and releasable means intermediate the fluid pressure means and support for transmitting the movement of the fluid pressure means to the support.

4,013,140

SAFETY EQUIPMENT

Jacques Pradon, 19 avenue de la Tourelle, Saint-Maur-Des-Fosses, France

Filed Oct. 30, 1975, Ser. No. 627,036
Claims priority, application France, Oct. 31, 1974, 74.36513; Sept. 30, 1975, 75.29935
Int. Cl.² E06C *5/36, 7/18*
U.S. Cl. 182—1 **12 Claims**



1. Safety equipment for a station providing access to the tops of vehicles of different heights, the equipment comprising:

a platform alongside which a vehicle is to be located;

support means on said platform;

access means;

means for articulating said access means on said platform, said access means comprising a pivotal assembly movable between an inoperative position away from the vehicle and an operative position in which it bears on that side of the vehicle closest to said platform;

a first protective system comprising first protective panel means; and

means for articulating said first panel means on said platform and comprising arm means articulated to said first panel means and to said support means on said platform, said first panel means being movable between an inoperative position away from said vehicle and an operative position in which it bears on that side of the vehicle remote from said platform.

4,013,141

MEANS FOR LUBRICATING A MECHANISM DISPOSED WITHIN A ROTATING SHAFT

Freeman D. James, Fairfield, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 16, 1975, Ser. No. 622,980
Int. Cl.² F01M *11/00, 11/02, 11/06*
U.S. Cl. 184—6.11 **4 Claims**

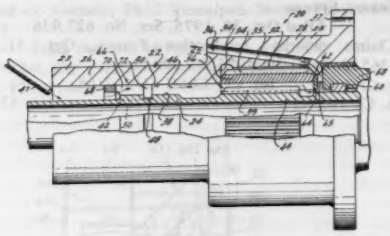
1. In a machine having a first hollow cylindrical rotatable shaft the combination comprising:

means for introducing lubricant onto the interior surface of said shaft at the upstream end thereof;

a device requiring lubrication disposed downstream of the upstream end of said rotatable shaft adjacent said interior surface, at least a portion of said device being spaced radially inward of said interior surface;

annular dam means disposed downstream of said device, said dam means extending radially inward of the bore of said shaft;

a second annular dam means disposed at the upstream end of said shaft in a first position in sealing engagement with



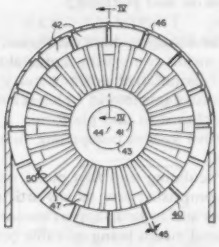
said interior surface for impeding the migration of lubricant in an upstream direction.

4,013,142

ELEVATOR SYSTEM HAVING A DRIVE SHEAVE WITH RIGID BUT CIRCUMFERENTIALLY COMPLIANT CABLE GROOVES

Arthur C. Hagg, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 7, 1975, Ser. No. 620,442
Int. Cl.² B66B *11/08*
U.S. Cl. 187—20 **11 Claims**



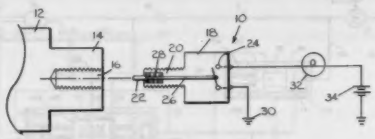
1. An elevator system, comprising:
an elevator car,
a counterweight,
a drive sheave including a hub portion rotatable about a drive axis, a plurality of metallic sector members, and means mounting said plurality of sector members on said hub portion in circumferentially spaced relation, said plurality of circumferentially spaced sector members defining at least one metallic cable groove about the drive axis,
means for driving said drive sheave about the drive axis,
and a cable interconnecting said elevator car and said counterweight while disposed about said drive sheave in the at least one cable groove,
said means which mounts the plurality of sector members on the hub portion of said drive sheave being selected to provide a circumferential compliance per sector member in a preferred range between a first value equal to the product of the maximum sliding displacement of the cable and the number of sector members in contact with the cable divided by the difference in the tension forces in the cable on opposite sides of the drive sheave, and a second value equal to about **1/10th** of said first value, allowing predetermined circumferential deflection of each sector member responsive to changes in the length of the cable as it passes over the drive sheave.

4,013,143

BRAKE LINING WEAR INDICATOR

John Emil Juhasz, Lake Orion, Mich., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed May 5, 1976, Ser. No. 683,476
Int. Cl.² F16D *66/02*
U.S. Cl. 188—1 A **9 Claims**



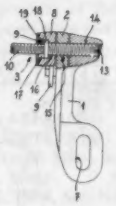
1. An indicator for indicating a predetermined amount of wear of a brake lining comprising slack adjusting means operatively connected to an arrangement of brake shoes for automatically compensating for the wear occurring to the brake lining on the brake shoes, said automatic slack adjusting means including a rotatable shaft means which rotatively moves in response to the wear of said lining on said brake shoe, a worm shaft having a threaded bore at one end thereof to receive a threaded member, electrical switching means disposed in said threaded member being operated by a plunger mechanism, said threaded member being restrained from rotation with respect to said rotatable shaft means by clamping means, said plunger being actuated by contacting a portion of the threaded bore of said worm shaft as said threaded member moves linearly with respect to said rotatable shaft means to activate said switch means to energize an indicating means elec ically connected to said switch means and an electrical power means.

4,013,144

CALIPER BRAKE FOR CYCLES AND THE LIKE

René Lauzier, Ruy, France, assignor to Angenieux-CLB S.A., St-Etienne, France

Filed June 29, 1976, Ser. No. 700,780
Claims priority, application France, July 11, 1975, 75.22632
Int. Cl.² B62L *1/10*
U.S. Cl. 188—24 **14 Claims**



1. A caliper brake for cycles and the like, comprising:
a bridge member adapted to be mounted upon a cycle;
a pair of arm members pivotally mounted about at least one axis fixed relative to said bridge member for swinging movement in opposite senses;
cable actuating means connected to said arm members for swinging same in said opposite senses;
respective brake shoes on said arm members displaceable against a wheel upon swinging movement of said arm members in said opposite senses; and
a shaft being coincident with said at leaast one axis and being secured to said bridge member said shaft having a threaded portion, one of said arm members being formed with an internally threaded bore of the same diameter as said threaded portion and screwed onto the latter with axial clearance from another of said members permitting rotation of said one of said arm members about said shaft

with slight axial displacement of said one of said arm members.

4,013,145

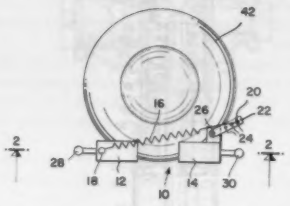
VEHICLE HILL HOLDER

Frank D. Mumm, Rancho Cordova, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Jan. 7, 1976, Ser. No. 647,082

Int. Cl.² B60T *3/00*

U.S. Cl. 188—32 **4 Claims**



1. A wheel chock comprising first block means and second block means opposable to one another, first resilient means pivotally secured to one side of said first block to swing in the direction of said second block and second resilient means pivotally secured to the side of said first block opposite said first resilient means to swing in the direction of said second block, lever means pivotally mounted on fulcrum means secured to said second block, said lever being movable toward the base of said second block to increase the tension on said first and second resilient means when said first and second resilient means are attached to said lever, means for detachably securing said first and second resilient means to said lever said resilient means being pivotally secured to said blocks through pivot means, said pivot means lying in a pivot plane above the base of said blocks, and said fulcrum lies in a fulcrum plane above said pivot so that when said lever is depressed downwardly in an arc below said fulcrum, said lever is biased by said resilient means in a downward direction toward the base of said second block.

4,013,146

DISC BRAKE COOLING STRUCTURE

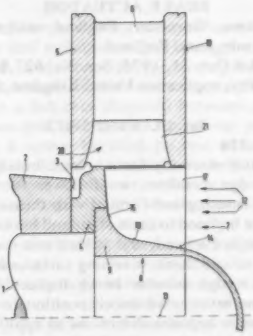
Hans Gebhardt, and Franz Prahl, both of Munich, Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Dec. 5, 1975, Ser. No. 638,064

Claims priority, application Germany, Dec. 18, 1974, 2459859

Int. Cl.² F16D *65/84*

U.S. Cl. 188—71.6 **4 Claims**



1. A brake disc for a railway vehicle disc brake operable in both directions of rotation and comprising a friction ring mounted on the end of a wheel hub to define an open space radially inwardly of said friction ring, a plurality of radial ribs attached to said friction ring to define cooling air ducts, a radial impeller disposed radially inwardly of said friction ring within the peripheral edge portion of said open space, said impeller having an axially directed intake and a radially directed outlet into said ducts and comprising a supporting ring having a substantially axially extending flow surface, radially oriented blades having radial inner edges positioned upon said supporting ring flow surface, said blades projecting axially in the direction of the intake of said impeller toward a friction surface on the side of said friction ring away from said wheel hub, the edges of said blades in the outlet direction extending in front of said radial air ducts, said supporting ring flow surface having a concave curved configuration with the portion of said curved surface at said intake being substantially axial and the portion of said curved surface at said outlet being substantially radial, and a cap having an outer convex curved surface and an end mounted over the opening enclosed by said supporting ring, the outer surface of said cap having a smooth transition to the axial intake portion of said curved surface of said supporting ring flow surface.

4,013,147

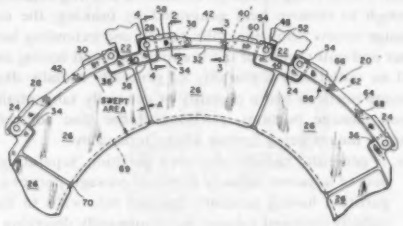
SEGMENTED FRICTION DISC FOR BRAKES

Bruce W. Anderson, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Sept. 2, 1975, Ser. No. 609,770

Int. Cl.² F16D *65/12*

U.S. Cl. 188—218 XL **4 Claims**



1. A friction disc comprising:

a plurality of arcuate segments arranged in end to end formation to define in part a substantially continuous annular friction member having opposite frictionally swept friction surfaces; and

an annular retaining ring including circumferentially spaced apart drive means positioned radially outwardly from said annular friction member;

each of said segments having circumferentially spaced apart projections extending radially outwardly from said annular friction member slidably connected to said annular retaining ring for limited circumferential movement relative thereto in the plane of said annular friction member;

said annular retaining ring including axially spaced apart first and second plate members positioned radially outwardly from said annular friction member;

said segment projections extending radially outwardly between the plate members and having circumferentially extending recesses for receiving said plate members such that said segments depend therefrom;

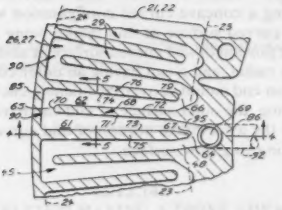
said first and second plate members being fixedly secured at opposite end portions to adjacent drive means.

4,013,148

INTERNALLY LIQUID COOLED DISC BRAKE

Jacob Kobelt, 6100 Oak St., Vancouver, British Columbia, Canada (V6M 2W2)

Filed Jan. 9, 1976, Ser. No. 647,753
Int. Cl.² F16D 65/853
U.S. Cl. 188—264 D 5 Claims



1. An internally liquid cooled disc for use in a disc brake assembly, the disc having an outer peripheral portion and being mounted on a brake shaft for rotation therewith, the peripheral portion having braking faces on opposite sides thereof adapted to be swept by brake pads of the brake assembly, and cooling passage means positioned adjacent and between the braking faces to conduct a cooling liquid therethrough to remove heat generated by braking, the cooling passage means being generally zig-zag and extending between inner and outer limits of the braking faces and having an inlet and an outlet and a plurality of generally radially disposed passage portions and a plurality of generally tangentially disposed passage portions, portions of the disc adjacent the passage means being further characterized by:

a. a generally radially disposed partition separating each pair of adjacent radially disposed passage portions, each partition having generally parallel side walls to that the radially disposed passage have outwardly diverging radial side walls so as to eliminate relatively thick portions of disc material between portions of the radially disposed passages to reduce formation of excessively hot areas on the braking faces,

b. a tangentially disposed passage portion extending across one end of each radially disposed partition to interconnect adjacent radially disposed passage portions, the generally tangentially disposed passage portions being adjacent the inner and outer limits of the braking faces and being shorter than the radially disposed passage portions,

c. spaced opposed web portions extending between adjacent partitions of the disc, the web portions having outer surfaces serving as portions of the braking faces and inner surfaces defining in part the radially disposed passage portions, the webs and partitions having generally similar thicknesses so as to reduce formation of excessively hot areas;

the assembly further including:

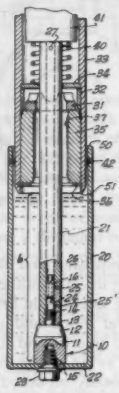
d. a rotary seal cooperating with the disc and connecting the inlet of the cooling passage means to a supply of cooling liquid.

4,013,149

EXTENDER FOR INCREASING THE TRAVEL OF MOTORCYCLE SHOCK ABSORBERS

Brian K. Fabre, 9447 Haines Canyon Road, Tujunga, Calif. 91352, and John S. Vander Laan, III, 11509 S. Bexley Drive, Whittier, Calif. 90606

Continuation-in-part of Ser. No. 527,068, Nov. 25, 1974, Pat. No. 3,912,054. This application Sept. 22, 1975, Ser. No. 615,287
Int. Cl.² F16F 9/54
U.S. Cl. 188—281 6 Claims



1. In a shock absorber of the type having a cylindrical oil-containing slider having a bottom end, a damper rod affixed to the bottom end of the slider, a fork tube having a lower end within said slider, and vertically movable with respect to the slider, a piston affixed in the lower end of the fork tube, the improvement which comprises:

a fork extender inside said slider and affixed at its lower end to the bottom end of the slider and positioned at the central axis of the slider, said fork extender having an exterior cylindrical body portion along its lower end, an exterior frustro-conical area above the cylindrical body portion decreasing in outside diameter upwardly along the extender, said frustro-conical area having an outside dimension small enough so that is can pass into the lower end of the piston to provide extreme damping near the point of maximum compression, and means for affixing in axial alignment the fork extender to the damper rod.

4,013,150

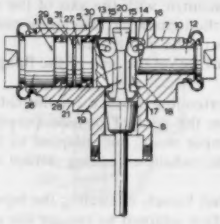
MECHANICALLY AND HYDRAULICALLY OPERATED BRAKE ACTUATOR

Norman Crabtree, Worcester, England, assignor to Girling Limited, Birmingham, England

Filed Oct. 31, 1975, Ser. No. 627,839
Claims priority, application United Kingdom, Nov. 15, 1974, 49435/74
Int. Cl.² F16D 51/22
U.S. Cl. 188—326 4 Claims

1. An actuator assembly for a vehicle brake comprising a housing, a wedge member, two follower members slidably guided in said housing and formed with thrust receiving surfaces which are inclined to each other and between which said wedge member is disposed, and at least one roller interposed between each of said thrust receiving surfaces and said wedge member, said wedge member being displaceable from a retracted position into an advanced position to urge said follower members in opposite directions to apply friction members into braking engagement with a rotor, wherein one of said follower members comprises a pair of axially arranged innermost and outermost hydraulic pistons working in a common

bore in said housing, said outermost piston having an outer face for engagement with one of said friction members and an inner face, and said innermost piston being provided with the said thrust receiving surface for the said one follower member and having an outer face for engagement with said inner face of said outermost piston, and a stop surface spaced axially from said outer face in an inward direction, and said housing is provided with a supply port communicating with a pressure space defined in said common bore between said inner face of



said outermost piston and said outer face of said innermost piston, which said faces abut when said wedge member is displaced from said retracted position, and with an abutment face with which said stop surface on said innermost piston is engageable when said wedge member is in said retracted position whereby said pressure space can be pressurised through said supply port to urge said outermost piston away from said innermost piston which is relatively stationary to apply one of the friction members into braking engagement with the rotor.

4,013,151

CLUTCH AND BACK PEDAL BRAKE

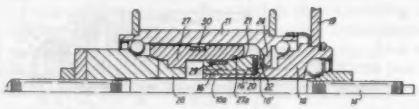
Anthony William Hillyer, Loughborough, England, assignor to Raleigh Industries Limited, Nottingham, England

Continuation of Ser. No. 387,255, Aug. 10, 1973, abandoned, which is a continuation of Ser. No. 206,330, Dec. 9, 1971, abandoned. This application Feb. 11, 1975, Ser. No. 548,925

Claims priority, application United Kingdom, Dec. 8, 1970, 58153/70

Int. Cl.² B60K *29/02*

U.S. Cl. 192—6 R **1 Claim**



1. A back-pedal brake hub for a cicycle or the like comprising a spindle, a shell mounted on ball bearings in ball races for rotation about said spindle, sprocket-and-driver means mounted at one end of said hub and supported for rotation by ball bearings in a ball race disposed between said sprocket-and-driver means and said spindle, the driver portion of said means having a screw-threaded portion extending axially within said shell, brake means within said shell and comprising cooperating sections with one section being non-rotatably connected with said spindle and another section being connected with said shell, clutch means mounted on said screw-threaded portion of said driver portion for longitudinal movement relative thereto in one axial direction or the other responsive to the direction of rotation of said driver portion, first abutment means fixed to said clutch means, means on said one section of said brake means and one end of said clutch means for urging said cooperating sections of said brake means together without axial loading of said ball races supporting said shell upon axial movement of said clutch means in a direction corresponding with a back-pedalling operation of the sprocket portion of said sprocket-and-driver means to effect braking of said shell relative to said spindle, said clutch member having ratchet-shaped teeth at the other end thereof, complementary ratchet-shaped teeth being provided on a drive transmission rib integrally connected with said shell, both sets of teeth having one side disposed radially of said spindle in a plane disposed axially of said spindle and the other side disposed at an acute angle thereto, said teeth being adapted to have their said one side brought into engagement upon axial movement of said clutch means in a direction corresponding to a forward operation of said sprocket portion, and a second abutment means carried by said sprocket-and-driver means for engaging said first abutment means so as to prevent said clutch member from imparting an axial load to said ball races supporting said shell when said teeth are engaged.

4,013,152

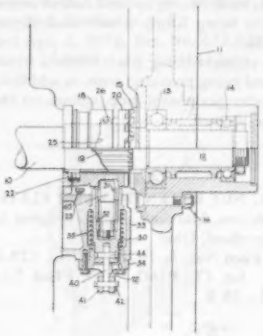
MECHANICAL CLUTCH FOR CYCLIC MACHINES

Clarence O. Jones, Jr., Eggertsville, N.Y., assignor to Niagara Machine & Tool Works, Buffalo, N.Y.

Filed Jan. 9, 1976, Ser. No. 647,893

Int. Cl.² F16D *11/04*

U.S. Cl. 192—24 **4 Claims**

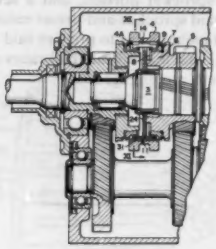


1. A single revolution clutch mechanism comprising a main shaft, a driving member rotatable on said shaft, a coupling member rotatable with said shaft and axially movable to engage and disengage said driving member and said shaft, a throwout member movable to a coupling-disengaging position, an actuating member releasably connected to said throwout member and selectively operable to move said throwout member away from said coupling-disengaging position for producing driving engagement between said driving member and said shaft, means for detaching said actuating member from said throwout member at the end of a cycle of revolution if the throwout member has not moved to coupling-disengaging position, and a latch rendered operative by detachment of said actuating member from said throwout member to prevent further operation of said actuating member until the condition causing said detachment has been corrected.

4,013,153
CLUTCH HUB FOR TRANSMISSION

Hideki Morino, Nagoya; Isao Tsuzuki, Kariya, and Kenji Koshino, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 15, 1975, Ser. No. 605,118
Claims priority, application Japan, Sept. 6, 1974, 49-103129; Sept. 6, 1974, 49-103130
Int. Cl.² F16D *23/10*, *13/60*
U.S. Cl. 192—53 F 8 Claims

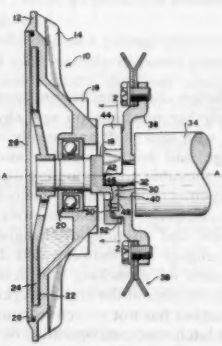


1. A transmission comprising,
an output shaft,
a driven gear mounted on said output shaft for rotation relative to said shaft, said driven gear having meshing splines on its outer peripheral face,
a clutch hub having splines on the outer periphery thereof and fitted on said output shaft,
and a hub sleeve axially slidable relative to said output shaft and having splines engageable with said clutch hub splines provided on the outer periphery of said clutch hub and also with said gear splines of said driven gear,
said clutch hub comprising a pair of annular cylindrical elements each having an end-wall at an end thereof, said end walls being firmly joined and aligned axially with each other,
each said element being press-formed from a metal sheet blank and being provided with, in addition to said splines on its outer peripheral face, splines on the inner peripheral face thereof.

4,013,154
MOUNTING NUT RETENTION FOR FLUID COUPLINGS

Richard J. Brown, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 6, 1975, Ser. No. 629,426
Int. Cl.² F16D *35/00*; F16B *7/18*
U.S. Cl. 192—58 B 5 Claims

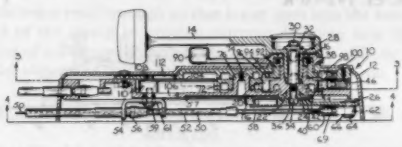


1. A mounting for connecting a viscous fan coupling with a mounting shaft that is rotatable about an axis, the coupling having a housing member defining a reservoir containing fluid, a rotor member located within the reservoir and operative with the fluid to rotate with the housing member about an axis, an input shaft having an axis coaxial with the axis of the members and secured to one of the members to rotate the one member, and the other member being adapted to support a fan, the mounting comprising:
A. a radially extending surface on the mounting shaft perpendicular to the axis of the mounting shaft;
B. at least one annular thread on the mounting shaft substantially concentric with the axis of the mounting shaft;
C. a flange on the input shaft extending radially outwardly from the axis of the input shaft;
D. a contact surface on the side of the flange closest to the one member;
E. a radially extending surface on the side of the flange opposite from the contact surface, perpendicular to the axis of the input shaft, and adapted to be matingly engaged with the radially extending surface on the mounting shaft;
F. an annular nut loosely encircling the input shaft, the nut having a surface adapted to engage the contact surface; and
G. at least one annular thread on the nut substantially concentric with the axis of the input shaft and threadedly engageable with the thread on the mounting shaft to move the mounting shaft toward the flange and force the perpendicular radially extending surfaces into tight frictional mating engagement with one another whereby torque may be transferred from the mounting shaft to the input shaft during rotation of the mounting shaft.

4,013,155
SINGLE LEVER CONTROL UNIT WITH THROTTLE LEVER

Roger Fred Olsen, Cuyahoga Falls, Ohio, assignor to Incom International Inc., Pittsburgh, Pa.

Filed Mar. 3, 1975, Ser. No. 555,022
Int. Cl.² B60K *41/00*, *41/02*
U.S. Cl. 192—.096 12 Claims

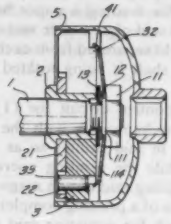


1. A single lever control for controlling engine, said control having a housing, a throttle actuating arm and a clutch actuating arm operatively connected thereto for rotation only during the first portion of rotation of the throttle actuating arm, said arms adapted for connection to the cores of push-pull cables for opening and closing the throttle and operating the clutch of said engine, the improvement comprising a warm-up auxiliary throttle lever operatively attached to a bracket means slidably mounted on said housing, said bracket means attached to the throttle cable conduit to move the cable conduit relative to said throttle cable core thereby adjusting throttle setting of said engine, interlocking means including an interengaging means carried by said bracket means, said interengaging means when engaging the outer surface of said throttle actuating arm prohibits the movement of said auxiliary throttle lever when said single lever is moved generally away from its neutral position and said interengaging means when disposed a certain distance within a slot in said throttle actuating arm prohibits movement of said single lever when said single lever is moved generally to its neutral position.

4,013,156
CENTRIFUGAL CLUTCH

Romeo Milošević, Koper, Yugoslavia, assignor to Tovarna motornih vozil TOMOS, Koper, Yugoslavia

Filed July 29, 1974, Ser. No. 492,872
Claims priority, application Yugoslavia, July 30, 1973, 2061/73
Int. Cl.² F16D *43/24*
U.S. Cl. 192—105 BA **1 Claim**



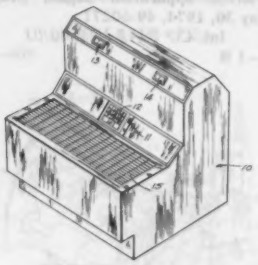
1. A centrifugal clutch comprising:
a driving member;
a hub mounted upon said driving member and rotatable thereby, said hub being formed with a plurality of annularly spaced radially extending arms;
a respective engaging segment radially displaceably carried by each of said arms, said segments each being formed on one axial side with a radial groove slidably receiving the respective arm and, on the opposite axial side with an arc-segmental shoulder formed with a narrow bevel;
an annular cup spring mounted on said driving member and having a frustoconical central portion of a large apex angle and a continuous axial periphery formed as a frustocone of smaller apex angle slidably engaging the bevels of all of said segments and urging same radially inwardly and axially against the respective arms;
clamping means engaging the inner periphery of said spring and securing same to said driving member;
a drum surrounding said segments and engaged thereby upon rotation of said driving member and said hub at an annular velocity sufficient to displace said segments outwardly against the force of said spring and the friction force between said arms and said segment, each of said arms being formed with a respective radial slot and each of said segments is provided with a plug extending slidably into the respective slot and limiting radial displacement of the respective segment along the respective arm;
a disk retained by said clamping means against said hub and forms a radial guide surface for said opposite sides of said segments; and
a prestressing washer interposed between said disk and said inner periphery of said cup spring to impart a predetermined prestress defined by the thickness of the washer to said cup spring.

4,013,157
BONUS PLAY MACHINE

John A. Britz, Palatine, and Richard M. Weissman, Chicago, both of Ill., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Filed July 30, 1975, Ser. No. 600,309
Int. Cl.² G11B *19/08*
U.S. Cl. 194—1 N **12 Claims**

1. A bonus play arrangement for a currency operated machine including:
a currency receiving switch actuated by currency deposited in said machine;
a credit circuit connected to said currency receiving switch and giving a fixed credit when the deposit of a first fixed currency amount is made;
a random event generator controlled by deposit of currency in said currency receiving switch and having a plurality of output conditions;
a bonus indicator connected to said random event generator to indicate a bonus condition upon the deposit of a first fixed currency amount; and

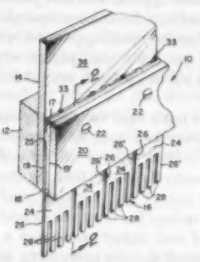


enabling means connecting said credit circuit to said random generator upon the deposit of a second fixed currency amount to give a fixed credit that can not be lost plus bonus credit if the random event generator is in a bonus credit condition, said bonus credit being given in addition to the accumulated fixed credit that has been purchased by said first and second fixed currency amounts.

4,013,158
ELECTROGRAPHIC SEGMENT ELECTRODE CLAMPING ASSEMBLY

Robert F. Strange, Round Rock, Tex., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,029
Int. Cl.² B41J *1/28*; G01D *15/06*
U.S. Cl. 197—1 R **12 Claims**



1. An electrographic printer segment electrode clamping assembly for use with electrographic printer stylus electrodes, comprising:
support means for mounting to the electrographic printer;
a segment electrode driver board carried by the support means;
an array of segment electrodes in electrical engagement with the driver board and disposable to engage stylus electrodes in an electrographic printing apparatus;
compressible means disposed on the array of segment electrodes opposite the driver board; and
clamping means for exerting a compressive force between the compressible means and the support means to deform the compressible means and thereby secure the alignment of the array of segment electrodes with respect to the support means mountable to the electrographic printer.

4,013,159

PRINTER HAVING A LIMITED MOVEMENT PLATEN AND/OR PRINTING HEAD AND INDEPENDENT SUPPORTS THEREFOR

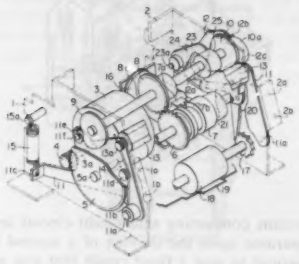
Katsuhiko Okabe, Tokorozawa, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed May 21, 1975, Ser. No. 579,425

Claims priority, application Japan, May 30, 1974, 49-60270; May 30, 1974, 49-60271

Int. Cl.² B41J *3/20, 13/03*

U.S. Cl. 197—1 R **5 Claims**



1. In a printer having a frame, a printing head and a platen, either one of said printing head and said platen being fixedly secured to said frame while the other is movably mounted on said frame by movable supporting means so as to move toward and away from said one of said printing head and said platen for the printing operation on a sheet held therebetween the improvement wherein said movable supporting means comprises:

a pair of supporting members each movably mounting said other of said printing head and said platen on said frame independently from each other at positions spaced from each other and about an axis parallel to the longitudinal axis of said other of said printing head and said platen;

each of said supporting members is biased by resilient means independently from each other so as to urge said other of said printing head and said platen toward said one of said printing head and said platen about said longitudinal axis and in a direction perpendicular to said longitudinal axis thereby insuring parallel relationship between said printing head and said platen when moved in said direction and about said axis into abutting relationship to each other;

means mounted upon said supporting members and operatively interconnected with additional means operatively formed with either one of said printing head and said platen, for controlling and limiting the range of rotation of said other one of said printing head and said platen;

said additional means for controlling and limiting the range of rotation of said platen comprises a peripheral groove formed in a shaft fixedly supporting said platen; and

said means comprises a spring mounted on said frame with its one end supported stationarily on said frame while the other end is engaged in said peripheral groove in said shaft.

2. A thermal printer adapted to be operated by a printing demand generated therein for a printing operation and to issue a printing completion signal upon completion of the printing operation, said printer comprising:

a driving motor,

a single revolution shaft driven by said driving motor through a single revolution clutch which is adapted to be rotated through a single revolution when actuated so that said shaft is rotated by one revolution each time said single revolution clutch is actuated,

a clutch magnet for actuating said single revolution clutch,

a control circuit for controlling the energization of said driving motor and said clutch magnet,

a thermal printing head and a platen, said thermal printing head and said platen being normally urged in abutting relationship to each other for the printing operation,

separating means operatively coupled with said single revolution shaft for releasing said abutting relationship between said thermal head and said platen so as to separate the same from each other during the time said single revolution shaft is being rotated through a single revolution,

a paper feeding means operatively coupled with said single revolution shaft for feeding a paper held between said thermal head and said platen after said thermal head and said platen are held separated from each other while said single revolution shaft is being rotated through a single revolution, and

means within sad control circuit for (1) energizing said driving motor simultaneously with the issuance of said printing demand in said printer so as to speed up said driving motor while the printing operation is being effected, (2) energizing said clutch magnet simultaneously with the inssuance of a printing completion signal so as to actuate said clutch for actuating said separating means and said paper feeding means in succession after the speed of said motor reaches its constant speed, and (3) deenergizing said motor after completion of the actuation of said separating means and said paper feeding means.

4,013,160

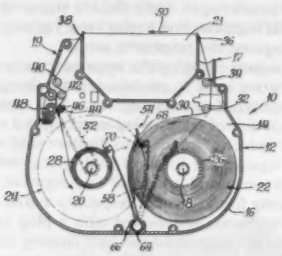
RIBBON TENSIONING DEVICE FOR RIBBON CARTRIDGE

Paul S. Colecchi, and Cezary Kotecki, both of Des Plaines, Ill., assignors to A. B. Dick Company, Chicago, Ill.

Filed Oct. 14, 1975, Ser. No. 621,686

Int. Cl.² B41J *33/52, 33/12*

U.S. Cl. 197—151 **7 Claims**



1. In a single pass ribbon cartridge for use in a typewriter, printer and the like, comprising a housing having mounted therein a ribbon supply spool and a takeup spool, a length of ribbon mounted on said supply spool and extending therefrom along a predetermined path out of and back into said housing to said takeup spool and a ribbon driving assembly, said driving assembly being drivable incrementally to transfer said ribbon from said supply spool to said takeup spool, the improvement comprising;

a ribbon tensioning device for providing a substantially uniform tension to said ribbon as it is transferred between said supply and takeup spools, said tensioning device including first and second arms coupled at first ends to each other to form a base, said device being mounted at said base for pivotal movement adjacent said ribbon spools, said arms being biased in opposing directions with the free ends of said arms being predeterminedly spaced and each engaging the ribbon wound about a respective one of said ribbon spools to exert a predetermined pressure thereagainst, said tensioning device being pivoted about said base as the ribbon diameters of said supply and takeup spools decrease and increase, respectively, during transfer of said ribbon from said supply to said takeup

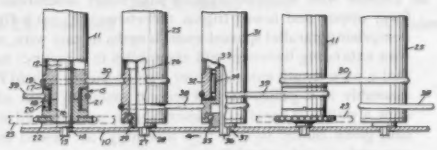
spool and said tensioning device further including means to create a predetermined differential in frictional coupling between the free end of a first one of said arms and the ribbon wound about said supply spool and the free end of the second one of said arms and the ribbon wound about said takeup spool, the frictional coupling between the free end of said first arm and ribbon wound about said supply spool being substantially greater than the frictional coupling between the free end of said second arm and the ribbon wound about said takeup spool, whereby a substantially uniform tension is maintained on said ribbon with a minimum of spilling and breakage thereof during transfer from said supply to said takeup spool.

4,013,161

ACCUMULATING ROLLER CONVEYOR

Walter T. Nelson, Frederick, Md., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed Feb. 3, 1976, Ser. No. 654,991
Int. Cl.² B65G *13/07*
U.S. Cl. 198—781 **7 Claims**



1. In an accumulating roller conveyor, the combination comprising

a frame,

a plurality of longitudinally spaced transversely extending drive rollers rotatably mounted on said frame,

drive means extending longitudinally of said frame,

and a spring clutch interposed between each said drive roller and said drive means,

a driven roller rotatably mounted on said frame upstream of each said drive roller,

means interconnecting said rollers such that when said drive roller is rotated, said driven roller is rotated,

a sensing roller rotatably mounted on said frame upstream and adjacent each said driven roller,

a one-way clutch on each said sensing roller,

means interconnecting said driven roller and said one-way clutch such that when said driven roller is rotated, said sensing roller is rotated,

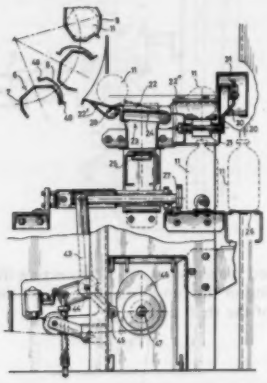
and means interconnecting said sensing roller and the drive roller upstream therefrom such that when a downstream sensing roller is stopped from rotating by the presence of an article thereon, the spring clutch of the drive roller upstream therefrom will be disengaged to stop the drive roller and, in turn, stop the driven roller upstream therefrom, and when a succeeding article engages the previously interrupted article, the upstream sensing roller will stop initiating a sequence to interrupt the drive and driven rollers further upstream, and when the first mentioned package is released, the sensing roller thereunder is permitted to rotate so that the spring clutches and one-way clutches are successively engaged upstream.

4,013,162

INSTALLATION FOR THE THERMAL TREATMENT OF OBJECTS

Jort Boer, Oostzaan, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands

Continuation-in-part of Ser. No. 410,399, Oct. 29, 1973, abandoned. This application July 1, 1975, Ser. No. 592,210
Claims priority, application Netherlands, Oct. 27, 1972, 7214631
Int. Cl.² B65G *47/24*
U.S. Cl. 198—409 **5 Claims**



1. An installation of the front loader type for the thermal treatment of objects, such as pasteurizing or sterilizing foodstuff or medicine, packed in glass or plastic, the combination of means defining a treatment space and an endless conveyor describing a path within said space, said conveyor having a plurality of carriers for the objects to be treated, each carrier comprising a C-shaped cross section and with a lengthwise extending movable cover, each carrier being internally provided with equidistant cross partition walls to define a number of compartments, a loading station at which the objects are loaded on said carrier a discharge station to discharge the objects being treated, said discharge station comprising at least one oscillating L-shaped catching element on which the bottom and one side of an object being treated bear, said catching element being parallel to the carriers while receiving said articles, said discharge station further comprising means for defining a transitory path for the discharged treated objects thereby bridging a gap between the compartments in the carrier to said catching element, said catching element having a pivot axis which extends in substantial alignment with said transitory path.

4,013,163

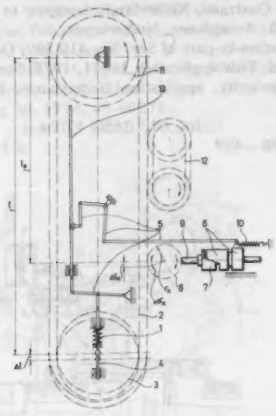
PHASE ADJUSTMENT APPARATUS

Ottó Gaál, Budapest, Hungary, assignor to Egyesult Izzolampa Es. Villamossagi Resveny tarsasag, Budapest, Hungary

Filed Nov. 17, 1975, Ser. No. 632,295
Int. Cl.² B65G *37/00*
U.S. Cl. 198—575 **5 Claims**

1. A device for maintaining the relative phase shift between an endless conveying element and at least one rotary work table comprising at least one fixedly journalled drive wheel, a tensioning wheel, and a resiliently loaded, displaceable and guided bearing for the tensioning wheel for the endless conveying element, process tools attached to said endless conveying element at equal spacing along its length, means for driving said at least one rotary table synchronously with the said endless conveying element, the drive means including a drive shaft for the said at least one rotary table, at least one shaft coupling for said drive shaft consisting of an axially fixed sleeve and an axially movable sleeve, complementary helicoi-

dal bearing surfaces with a predetermined pitch of thread on said fixed and movable sleeves, and a transmission with a



predetermined transmission ratio connecting the displaceably guided bearing of the tensioning wheel and the axially movable sleeve of the shaft coupling.

4,013,164

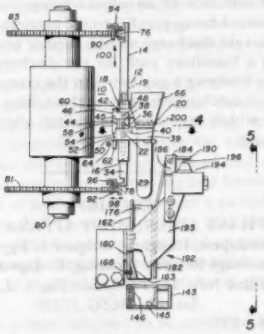
WORKPIECE CARRIER ASSEMBLY

Joseph R. Reilly, Naugatuck, Conn., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 536,416, Dec. 26, 1974, Pat. No. 3,937,315, which is a division of Ser. No. 480,604, June 19, 1974, Pat. No. 3,985,251, which is a division of Ser. No. 424,866, Dec. 14, 1973, Pat. No. 3,880,301. This application July 24, 1975, Ser. No. 598,563

Int. Cl.² B65G *17/32*

U.S. Cl. 198—655 **3 Claims**



1. An intergral workpiece carrier assembly comprising:

A. post means;

B. pivotal holder means associated with the post mear.s including arms for supporting the workpiece;

C. a trip mechanism mounted with and biasing the arms to a workpiece release position;

D. means for cooperating with nearby position-changing means for returning said holder means to a workpiece-engaging attitude; and

E. a funnel mounted to said holder means above the arms for guiding the workpiece into engagement with the arms.

4,013,165

CONVEYORS

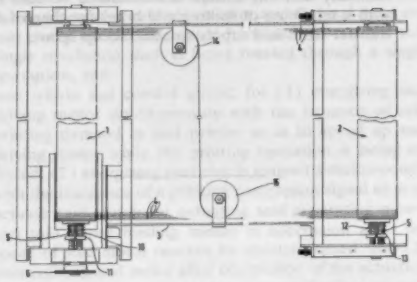
Anthony Harry Bush, Ascot, England, assignor to A. H. B. Services (Engineers) Limited, England

Filed June 5, 1975, Ser. No. 584,213

Claims priority, application United Kingdom, June 5, 1974, 25015/74

Int. Cl.² B65G *15/10*

U.S. Cl. 198—817 **7 Claims**



1. A conveyor comprising:

first and second spaced-apart roller assemblies, each roller assembly including an equal number of coaxial pulleys, each of the pulleys in each said assembly being mounted so as to be capable of independent rotation at a speed differing from that of any other of the remaining pulleys of the respective said assembly;

an endless wire wrapped around said roller assemblies to form upper and lower flights therebetween, each flight comprising parallel spaced-apart lengths of said wire, said wire extending between said assemblies in a manner such that a wire length extends from a given pulley in said first assembly to a pulley in said second assembly next adjacent a pulley thereof corresponding to and aligned with said given pulley in said first assembly, as viewed from one end of said assemblies;

guide means for directing said wire from the last pulley in one of said assemblies to the first pulley in the other of said assemblies, as viewed from said one end of said assemblies; and

drive means operatively connecting all of the pulleys of one of said assemblies for causing movement of said endless wire along said assemblies by rotation of said pulleys of said one assembly at relatively different speeds.

4,013,166

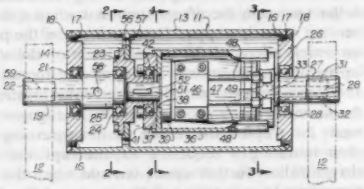
HYDRAULIC DRIVEN PULLEY FOR CONVEYORS

Andrew A. Weady, Los Gatos, and Jerome T. Denz, Tiburon, both of Calif., assignors to Hydraulic Drives, Inc., Burlingame, Calif.

Filed Nov. 10, 1975, Ser. No. 630,367

Int. Cl.² B65G *23/08*

U.S. Cl. 198—835 **3 Claims**



1. A conveyor pulley comprising a cylindrical shell for a

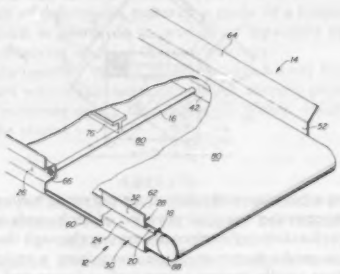
conveyor belt, a first and a second shaft adapted to be stationarily held in support means, first and second means for rotatably mounting said shell relative to said first and second shafts, respectively, a fluid motor located entirely within said shell and having a motor shaft and a manifold having fluid intake and outlet ports, a drive member fixed to said motor shaft and to said shell whereby rotation of said motor shaft turns said shell, a stationary motor support entirely within said shell in which said motor is mounted, said drive member being rotatable relative to said motor support, said second shaft formed with first and second longitudinal ducts, conduit means connecting said first and second ducts with said fluid intake and outlet ports, said motor support comprising a trough-like U-shaped member in which said motor is fitted, said U-shaped member having a bearing cap at a first end through which said drive member and said motor shaft extend and a second end fixed to said U-shaped member through which said second shaft extends, the inner end of said second shaft being supported by said second end, said U-shaped member having an internal first flange at the inner end, said first flange being formed with a slot longer than said first shaft, said motor being supported by said U-shaped member, the inner end of said motor having a second flange fitting tightly against one surface of said first flange, said bearing cap fitting tightly against the surface of said first flange opposite said second flange, said slot providing an opening through which the shaft of said motor may be inserted during installation of said motor.

4,013,167

CONVEYOR SUPPORT STRUCTURE

Ronald D. Bourgeois, Waltham, Mass., assignor to Custom Fabricators, Inc., Waltham, Mass.

Filed May 21, 1975, Ser. No. 579,320
Int. Cl.² B65G *15/60*
U.S. Cl. 198—861 **3 Claims**



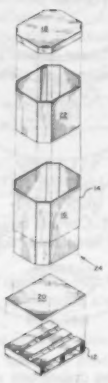
1. A conveyor system support structure comprising:
first and second monolithic, longitudinally corrugated side support members;
transverse support means, including at least one transverse support member for interconnecting said side support members, each said transverse support member including fastening means at each end for engaging with said side support members;
each said side support member including at least one positive and one negative corrugation, each said positive corrugation including an inwardly disposed element and interconnection elements in common with adjacent negative corrugations, and each said negative corrugation including an outwardly disposed element and interconnection elements in common with adjacent positive corrugations; and
a tension adjustment mechanism including a corrugated plate for snugly nesting in, and being slidably guided by said corrugations of a said side support member, a reference member fixed to said side support member and means interconnecting said reference member and plate for adjusting the distance therebetween.

4,013,168

SHIPPING CONTAINER

Robert A. Bamburg; Farris N. Duncan, both of West Monroe, and Roger M. Floyd, Monroe, all of La., assignors to Olinkraft, Inc., West Monroe, La.

Filed Dec. 22, 1975, Ser. No. 643,450
Int. Cl.² B65D *19/20*
U.S. Cl. 206—386 **17 Claims**



1. A combination pallet/shipping container, comprising:
a. a pallet;
b. a shipping container positioned on top of said pallet;
1. said container having formed on one end thereof a plurality of flaps;
c. a flat sheet having edges and corner portions and positioned between said pallet and said container for forming the bottom of said container, said corner portions of said flat sheet being exposed on the outside of said container;
1. at leat two of said flaps being folded inwardly into the interior of said container and lying on top of said flat sheet;
2. the remaining of said flaps being folded inwardly over the edges of said sheet and lying under said flat sheet between said pallet and said flat sheet; and
d. means for fastening the exposed corner portions of said sheet to said pallet.

4,013,169

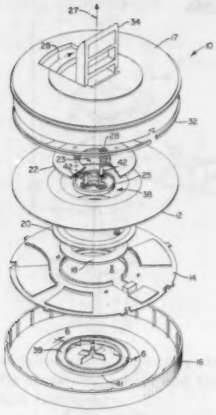
MAGNET RING CONFIGURATION AND DISC CARTRIDGE INCLUDING MAGNET RING CONFIGURATION

George T. Cheney, Manchester, N.H., assignor to Nashua Corporation, Nashua, N.H.

Continuation-in-part of Ser. No. 328,933, Feb. 2, 1975, abandoned, and a continuation-in-part of Ser. No. 489,916, July 19, 1974, Pat. No. 3,917,068, and a continuation-in-part of Ser. No. 515,822, Oct. 18, 1974, abandoned. This application Dec. 5, 1975, Ser. No. 637,844
Int. Cl.² B65D *85/30, 45/00*
U.S. Cl. 206—444 **5 Claims**

1. A disc cartridge of the type which includes a memory disc covered by two covers, a top and a bottom cover, and a draw plate of a type which has post apertures through which posts are secured to the draw plate and a pair of posts for engagement with a handle assembly on one cover and which draws the memory disc toward one cover when the handle is rotated, wherein the improvement comprises said draw plate having a pair of warp reducing apertures, each of said warp reducing apertures and the post apertures being located an equal distance from the center of the circular draw plate and each warp

reducing aperture being along an inner circumference of said circular draw plate at a distance of 90° of arc from a post aperture also located along said inner circumference, the bottom of the posts having a coarse knurl formed thereon which friction fits directly into a post aperture formed in the material from which the draw plate is fabricated, the direct



fitting of said posts into the draw plate enabling the posts to be flexed to facilitate the alignment of the posts with the handle assembly and wherein the bottom cover of the cartridge includes a ring magnet positioned on the inside thereof, said ring magnet making magnetic contact with an armature plate which is connected to said top cover to maintain said cartridge in a closed position.

4,013,170

SHIPPING CONTAINER

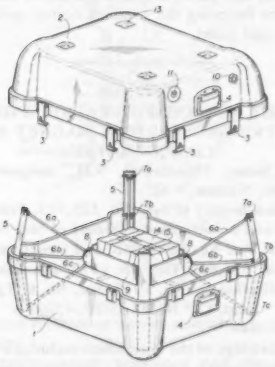
Karl Hutterer, Neugermering, Germany, assignor to Dornier System GmbH, Friedrichshafen, Germany

Filed Jan. 12, 1976, Ser. No. 648,260

Claims priority, application Germany, Jan. 18, 1975, 2501913

Int. Cl.² B65D *81/10, 85/30*

U.S. Cl. 206—521 **10 Claims**



1. A shipping container comprising:

a. a shell including a plurality of parts and connecting means for releasably connecting said parts,

1. the connected parts of the said shell bounding a cavity;

b. a plurality of elongated, rigid base members mounted on said shell in said cavity in spaced relationship;

c. a set of three elongated, resilient tension elements associated with each base member,

1. each tension element having first and second longitudinally terminal portions;

a. three first fastening means longitudinally spaced on each base member and respectively fastening the first longitudinally terminal portions of the associated tension elements to the base member,

1. one of said three first fastening means being interposed between the other two first fastening means,

2. the tension elements fastened to said base member by said other two first fastening means being more resilient than the tension element fastened to said base member by said one first fastening means;

e. second fastening means fastening the second longitudinally terminal portions of said tension elements associated with each base member to each other; and

f. attaching means for attaching said second fastening means to a load suspended in said cavity by said tension elements,

1. said associated tension elements converging from said first toward said second fastening means.

4,013,171

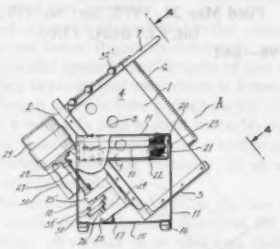
CARD SELECTOR

Albert William Ferrin, Defiance, Mo., and John G. Callos, Youngstown, Ohio, assignors to A. W. Ferrin, Beatrice Ferrin, Donald H. Stephen, Trustees of the Lectrojog Company, Defiance, Mo.

Filed Jan. 2, 1976, Ser. No. 646,396

Int. Cl.² B07C *5/12*

U.S. Cl. 209—80.5 **3 Claims**



1. In combination with data receiving cards having perforations adjacent the marginal portions of such cards and preselected perforations of each card opening through the adjacent margin, a card selector machine comprising a casing, a card assemblage cradle having a rear wall, a lower end wall, and parallel side walls, said cradle being open at the front end and upper end thereof, means resiliently mounting said cradle upon said casing in an attitude wherein its major axis is at an angle of less than 90° to the vertical whereby said rear wall inclines downwardly and forwardly and said lower end wall inclines upwardly and forwardly, means located within said casing and rearwardly of said cradle rear wall effecting vibrational movement of said cradle, the side walls of said cradle being of greater length than that of the data receiving cards, said cradle side walls having opposed edge portions at the ends thereof remote from said lower end wall, said rear wall projecting beyond the opposed edge portions of said cradle side walls, means suspending an assemblage of data receiving cards within said cradle from said cradle side wall opposed side edge portions wherein the upper ends of said cards within such assemblage are mutually aligned and project above said side edge portions, the rearward edges of said cards of said assemblage being restingly supported by said cradle rear wall, said card suspending means being engageable within predetermined aligned perforations in the upper margins of the cards of the received assemblage whereby upon vibration of said cradle cards in which all of the engaged perforations open through the adjacent margin will lose contact with the sus-

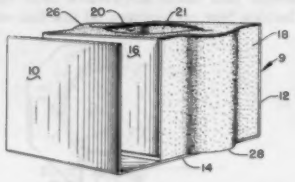
pending means and descend toward the lower end of said cradle for retention thereby together with said rear wall for collection pending facile removal.

4,013,172

FILE CARD HOLDER

Dave O. Foreman, 707 SE. Avenue A, Andrews, Tex. 79714

Filed July 10, 1975, Ser. No. 594,699
Int. Cl.² B42F *7/10*
U.S. Cl. 211—51 **4 Claims**



1. A fild card holder within which there can be stored a plurality of cards of varying thickness and any length comprising:

an upwardly opening, U-shaped support member having a forward and a rearward wall surface; a body of deformable material having a forward wall surface which can be yieldably moved toward a rearward wall surface; and a plate member;

means attaching said plate member to said forward wall surface of said body;

means attaching said rearward wall surface of said body to said rearward wall surface of said support member such that said plate member is resiliently urged toward said forward wall surface of said support member;

said body of deformable material is made of a foamed plastic which is apertured to provide an upwardly opening, card receiving opening therein; whereby:

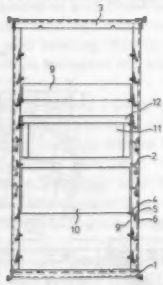
said plate member can be yieldably urged away from said forward wall of said support member, thereby providing a card receiving space therebetween, within which cards may be stored.

4,013,173

STAND INCLUDING MOVEABLE SUPPORTS FOR ACCOMMODATING ARTICLES OF DIFFERENT HEIGHTS AND DEPTHS

Willem Snijders, Tilburg, Netherlands, assignor to Snijders Metaalwarenfabriek B.V., Tilburg, Netherlands

Filed Feb. 24, 1975, Ser. No. 552,009
Int. Cl.² A47F *3/14*
U.S. Cl. 211—126 **6 Claims**



1. A stand adapted to receive articles comprising:

a frame;

a plurality of support means adapted to support said articles and attached to said frame means, said support means including a tapered portion where said support means first makes contact with an inserted article, said tapered portion being such that when viewed in the direction of insertion of an article it gradually increases in width;

a pivotal shaft associated with said support means for displacing said support means transversely to the direction of insertion of an article into said stand, said pivotal shaft extending parallel to the direction of insertion of an article into said stand, and being pivotally received in the frame of said stand; and,

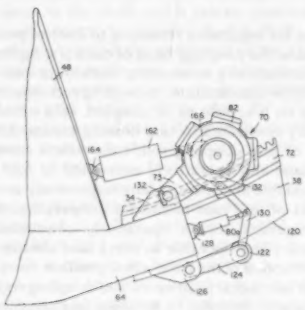
stop means for limiting the rotation of said support means, wherein said support means tends to return to its original starting position after an article is removed from said stand.

4,013,174

SWING DRIVE WITH AUTOMATIC SHUT-DOWN CONTROL

James G. Morrow, Sr., and David J. Pech, both of Manitowoc, Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.

Continuation-in-part of Ser. No. 522,787, Nov. 11, 1974, Pat. No. 3,949,881. This application Oct. 22, 1975, Ser. No. 624,765
The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.
Int. Cl.² B66C *23/86*
U.S. Cl. 212—68 **5 Claims**



1. A swing drive assembly for a load handling device having upper works rotatable about a central pivot and supported by rollers on a roller path disposed substantially concentrically with said pivot, comprising, in combination, a frame element mounted on said upper works and extending outwardly therefrom to adjacent said roller path, means defining a ring gear secured to one peripheral edge of said roller path, mounting means on said frame element for journalling a pinion gear for normal engagement with said ring gear and for moving said pinion gear toward and away from said ring gear, a guide flange mounted on said roller path concentric with said ring gear, a guide roller supported by said frame element and journalled for engagement with said flange, means including a reversible hydraulic motor for driving said pinion against said ring gear so as to swing said upper works about said pivot, first actuator means including a hydraulic actuator for urging said pinion toward said ring gear and said roller into engagement with said flange so as to maintain substantially constant backlash between said pinion and ring gear regardless of eccentricities in said roller path, hydraulic pump means for selectively pressurizing said motor and for constantly pressurizing said first actuator during normal swing drive operation, and means for bypassing the flow of hydraulic fluid around said motor and second actuator means including a compression spring for

urging said pinion toward said ring gear and said roller into engagement with said flange when said pump means is shut down.

4,013,175

DEVICE FOR CONTROLLING THE RETURN OF A CENTRAL COUPLING FOR RAIL VEHICLES TO ITS CENTRAL POSITION

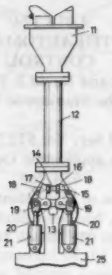
Willi Klein, Remscheid; Henning Rocholl, Radevormwald, and Reinhard Naydowski, Remscheid, all of Germany, assignors to Bergische Stahl-Industrie, Remscheid, Germany

Filed Sept. 23, 1975, Ser. No. 615,843

Claims priority, application Germany, Sept. 24, 1974, 2445460

Int. Cl.² B61G 7/12

U.S. Cl. 213—20 **15 Claims**



1. A device for adjustably returning to central position in a horizontal plane the coupling head of central couplings, especially for automatically connecting individual rail vehicles, which includes in combination: a coupling rod, housing means for mounting on a vehicle to be coupled, said coupling head being pivotally connected to said housing means through the intervention of said coupling rod, cam means movable in a horizontal plane and operatively connected to said coupling rod, two adjustable abutment means respectively arranged on opposite sides of said cam means for cooperation therewith, and power operable means operatively connected to said abutment means and operable to move said abutment means along said horizontal plane from a first position corresponding to the central horizontal position of said coupling rod in which said cam means is clampled in between said abutment means to a second position in which said coupling rod occupies the position of its maximum lateral horizontal deviation from said first and thereby said central position, and vice versa, dish-shaped means having said cam means arranged thereon and being directly connected to said coupling rod, and a cushion of rubber material, said cam means being arranged on said dish-shaped means, and said dish-shaped means being frictionally connected to said coupling rod through said cushion, a sliding member and guiding means for guiding said sliding member, one end of said intermediate lever means being pivotally connected to said sliding member, and said sliding member being rigidly connected to said piston rod.

4,013,176

UNITARY WORK CHANGER FOR A MACHINING CENTER

Earl R. Lohneis, Milwaukee, and John J. Schachte, Wauwatosa, both of Wis., assignors to Kearney & Trecker Corporation, West Allis, Wis.

Continuation of Ser. No. 12,057, Feb. 17, 1970, abandoned. This application Dec. 4, 1972, Ser. No. 311,851

Int. Cl.² B25J 3/00

U.S. Cl. 214—1 BD **3 Claims**

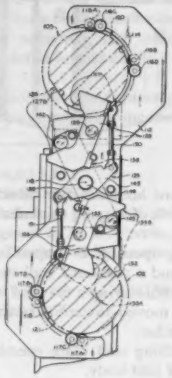
1. In a machine tool having a frame;

a member receiving operating support and a member receiving storage support carried in spaced apart positions by said frame;

a member gripping transfer arm pivotally movable from parked position to effect a bodily interchange of members between said supports;

first power control means operative to pivot said transfer arm from said parked position into gripping engagement with the members respectively carried by said supports;

second power control means operative to pivot said transfer arm in a transfer movement to bodily interchange the positions of the members gripped thereby between said



supports to again be received in said supports in interchanged positions;

third power control means operative to pivot said transfer arm to parked position; and,

velocity control means connected to be selectively actuated by movement of said transfer arm and connected to effect gradual acceleration and gradual deceleration of said transfer arm as well as to regulate its uniform velocity between the acceleration and deceleration periods to control each of its three cycles of movement including approach, transfer and return movements.

4,013,177

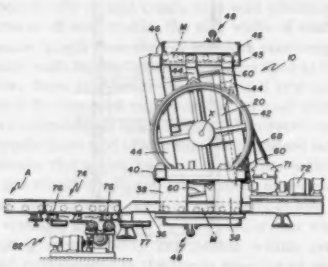
COIL INVERTER

Roger Kinnicutt, Jr., and William J. Hill, both of Holden, Mass., assignors to Morgan Construction Company, Worcester, Mass.

Filed June 2, 1975, Ser. No. 582,612

Int. Cl.² B65G 7/00

U.S. Cl. 214—1 Q **5 Claims**



1. Apparatus for inverting a cylindrical coil, comprising: a stationary housing; a cradle mounted on said housing for

rotation about a turning axis, said cradle having opposed roller table modules on opposite sides of said turning axis; first and second pallets, each having a generally U-shaped base with upstanding support members against which a coil is inclined when carried on the pallet base; clamping means for clamping said first pallet with a coil carried thereon to one of said roller table modules and for clamping said second pallet to the other of said roller table modules, the coil thus being confined radially by the support members of both said first and second pallets; holding means on said cradle for axially confining the coil; and, means for rotating said cradle about said turning axis to invert the coil, whereupon when said holding means is released, the coil will be received on said second pallet.

4,013,178

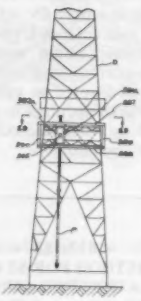
PIPE RACKER

Cicero C. Brown, deceased, late of Houston, Tex., and by Joe R. Brown, executor, P.O. Box 19236, Houston, Tex. 77024

Filed Jan. 17, 1975, Ser. No. 541,709

Int. Cl.² E21B *19/00*

U.S. Cl. 214—2.5 **24 Claims**



1. A pipe manipulating system comprising:
a. generally tubular housing means;
b. arm means mounted in and constrained by said housing means, and longitudinally extendable and retractable with respect to said housing means;
c. pipe gripping means mounted on, and movable with, said arm means;
d. slip means included in said pipe gripping means;
e. first power means comprising fluid pressure means to advance and retract said slip means to selectively engage and support, or release, said pipe;
f. mounting means supporting said housing means, and providing substantially vertical and substantially horizontal movability to said housing means and to said arm means;
g. second power means to longitudinally extend and retract said arm means with respect to said housing means;
h. third power means to provide substantially vertical locomotion to said housing means and to said arm means; and
i. fourth power means to provide substantially horizontal locomotion to said housing means and to said arm means.

4,013,179

APPARATUS FOR GROUPING COOKIES PRIOR TO PACKAGING

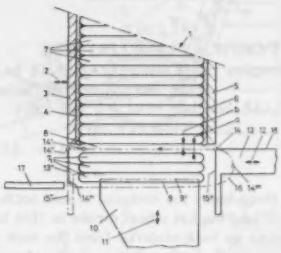
René Fluck, Neuhausen am Rheinfall, Switzerland, assignor to S I G Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Sept. 18, 1975, Ser. No. 614,594

Claims priority, application Switzerland, Sept. 18, 1974, 12664/74

Int. Cl.² B65G *59/06*

U.S. Cl. 214—8.5 K **2 Claims**



1. In apparatus for forming a succession of fragile flat objects into groups and including a supply shaft having a vertical outlet portion presenting an outlet end at its bottom, with a stack of such objects being disposed in the vertical outlet portion of the shaft, a clamping device associated with the shaft and movable between the clamping position in which it holds objects in the shaft and a release position in which it permits such objects to descend in the shaft, a depository member disposed below the outlet end of the shaft to receive objects leaving the outlet end, and a pusher member movable both transversely and parallel to the longitudinal direction of the vertical outlet portion of the shaft for bringing objects leaving the outlet end of the shaft when the clamping device is in its release position to the depository member and for then pushing such objects away from the depository member, the improvement wherein: said depository member is mounted for movement parallel to the longitudinal direction of said vertical outlet portion of said shaft, between a raised position and a lowered position; and said pusher member is mounted for movement in a manner to bring objects to said depository member when said depository member is in its raised position and to push such objects away from said depository member when said depository member is in its lowered position.

4,013,180

DEVICE FOR THE REMOVAL OF BULK MATERIAL FROM BULK MATERIAL DUMPS

Günter Piontek, Drevenack; Heinz Firlay, Bochum, and Heinz Westheider, Oberhausen, all of Germany, assignors to Deutsche Babcock & Wilcox Aktiengesellschaft, Oberhausen, Germany

Filed May 16, 1975, Ser. No. 578,348

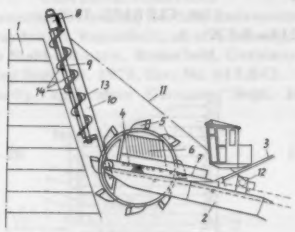
Claims priority, application Germany, May 16, 1974, 2423715; Mar. 12, 1975, 2510665

Int. Cl.² B65G *65/28*

U.S. Cl. 214—10 **9 Claims**

1. A device for removal of bulk materials from bulk material storage sites comprising, in combination, pickup means; breakup means adaptable to the inclination of the bulk material storage site, said breakup means comprising a rotatable shaft roller having blades inclined with respect to the longitudinal axis of the shaft roller and comprising conveying elements, said pickup means comprising bucket wheel means with diameter smaller than the height of said storage site, said breakup means being in front of said bucket wheel means and extending from the cutting surface of said bucket wheel means; said breakup means operating cooperatively with said

bucket wheel means and conveying bulk material to the front of the buckets of said bucket wheel means; boom means for carrying said bucket wheel means, said breakup means being mounted on said boom means, said breakup means contacting said storage site above said bucket wheel means, whereby said breakup means is in contact with the storage site prior to contact of the bucket wheel means with said storage site, said inclined blades removing a cut section from said storage site



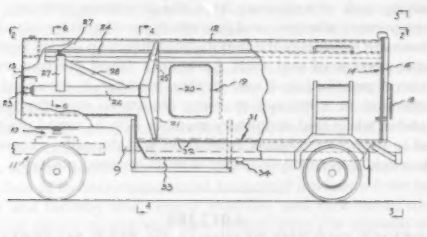
and conveying throwlessly the material in said section in front of the buckets of said bucket wheel means so that said bucket wheel means picks up bulk material from the base portion of said storage site and from the portion lying above the base portion, said breakup means removing a cut section from the storage site in the form of broken material, said broken material being carried downward along the axis of said shaft roller to the front of the buckets of said bucket wheel means.

4,013,181

LOAD-COMPACTING VEHICLE

Raymond Neils Johnson, 6/307 Bondi Road, Bondi, New South Wales, Australia

Filed June 23, 1975, Ser. No. 589,549
Int. Cl.² B60P *1/00*
U.S. Cl. 214—82 **6 Claims**



1. A load-compacting vehicle which includes plunger mounting means comprising:

a pair of parallel rails which extend longitudinally within the vehicle barrel adjacent the top thereof and for substantially the full length thereof;

first runner elements on said plunger by which it is mounted on said rails for load-compressing movement longitudinally of said barrel;

an outrigger structure fixed on the ram device on which said plunger is mounted, and

second runner elements on said outrigger structure which ride said rails and are spaced, axially of said barrel, from said first runner elements,

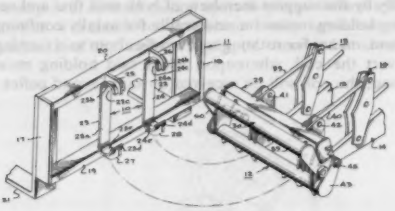
said outrigger structure having a triangular frame spaced from said plunger and having a first apex portion fixed to a cylinder forming part of said ram device and second and third apex portions at which said second runner elements are respectively located; and a pair of diagonal struts having trailing ends fixed to said cylinder adjacent said plunger and leading ends joined to said triangular frame adjacent said second and third apex portions.

4,013,182

DETACHABLE COUPLING SYSTEM

Samuel S. Pratt, Core, W. Va., and Peter N. Lalos, Gaithersburg, Md., assignors to Rockland, Inc., Wintergarden, Fla.

Filed Apr. 21, 1975, Ser. No. 569,684
Int. Cl.² E02F *3/81*
U.S. Cl. 214—145 A **15 Claims**



2. A system for detachably coupling an attachment to a prime mover provided with a mounting means and an actuating means comprising a female device mountable on said attachment and a collapsible male assembly mountable on said mounting means on said prime mover, cooperatively engagable with said female device, said male assembly being operatively connectable to said actuating means and movable thereby between a collapsed, inoperative condition and an extended, operative condition operatively engageable with said female device in coupling relation when said male assembly is positioned adjacent said female device in registry therewith, the male assembly comprising a collapsible mechanical linkage including components cooperatively engagable with said female device in coupling relation when the male assembly is in said extended, operative condition, and means mounted on said male assembly for selectively locking said collapsible linkage in said extended, operative condition including a fluid actuating piston and cylinder assembly mounted on a component of said collapsible linkage and having a piston thereof adapted to extend and be inserted through a pair of registered openings in a pair of components of said collapsible linkage when said collapsible linkage is in the extended, operative condition.

4,013,183

APPARATUS AND METHOD FOR STACKING BRICKS IN PREPARATION FOR STRAPPING

William F. Milholen, Siler City, and Cletus E. Lineberry, Staley, both of N.C., assignors to Forrest Paschal Machinery Co., Siler City, N.C.

Division of Ser. No. 469,649, May 14, 1974, Pat. No. 3,924,756. This application June 25, 1975, Ser. No. 590,260
Int. Cl.² B65G *57/26*
U.S. Cl. 214—152 **2 Claims**

1. A method for stacking double layer courses of cured bricks, each of said layers having a plurality of rows and columns of bricks therein, in preparation for a subsequent strapping operation, said method comprising the steps of:

a. receiving successive ones of said courses on a receiving plate;

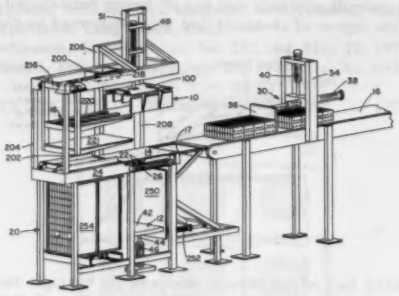
b. applying gripping pressure simultaneously against all of the row ends of each successive course while still supported by said receiving plate above an elevator means;

c. removing said receiving plate to provide open communication between said elevator means and said gripped and supported course;

d. raising said elevator means until it reaches a point substantially in engagement with the underside of the lowermost layer of said course;

e. releasing said course onto said elevator means;

f. lowering said elevator means to a point where the upper surface of the uppermost layer of said course is at a point beneath the level of said receiving plate; and



g. repeating steps (a) through (f) until a stack is formed.

4,013,184

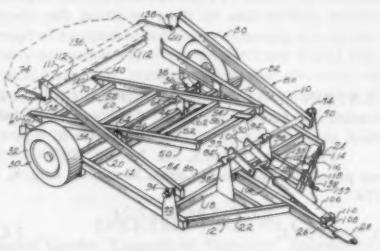
TRAILER FOR LIFTING AND TRANSPORTING A CONTAINER

James H. Lacy, Lawrenceville, Ga., assignor to Lacy's Metal Products, Inc., Lawrenceville, Ga.

Filed Sept. 22, 1975, Ser. No. 615,699

Int. Cl.² B60P 1/28

U.S. Cl. 214—505 **17 Claims**



1. In a vehicle for loading and unloading and transporting a large container:

a vehicle trailer having a trailer drawbar with a trailer coupling thereon,

a rigid trailer frame chassis which is normally stationary when the container is being lifted on or off the trailer,

wheels on the opposite side of said trailer frame chassis for engaging the ground while said trailer is moving thereover,

container support means on said trailer chassis for supporting said container and said container support means comprising a movable support frame extending transversely across and being movably attached to said trailer frame chassis to receive said container, said support frame being inclined longitudinally from normal horizontal position in a direction from the ground upwardly over the trailer frame chassis for loading and unloading a container, and to move during loading or unloading of said container to shift with the longitudinal movement of said container thereby supporting at least part of the weight of said container and also guiding same,

a power means on said trailer chassis for movement thereon and for attachment to said container to move same,

said power means comprising a longitudinal lifting frame having one end thereof attached to said container and the other end attached to the trailer for movement from a forwardly position in which said container is in place to a rearwardly position for loading said container on said movable frame, and means for attaching and detaching the end of said lifting frame to said container, said means removably attaching the ends thereof to said lifting frame and to said container, respectively, and being relatively movable on said lifting frame as said container is moved along said support frame and vice versa when said container is unloaded, said lifting frame pulling said container onto said movable frame and therealong as said movable frame shifts into position on said chassis with said container thereon.

4,013,185

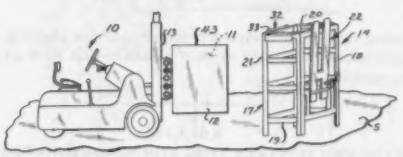
LIFT TRUCK ATTACHMENT

William Lee Bratton, St. Louis, Mo., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jan. 15, 1975, Ser. No. 541,224

Int. Cl.² B66F 9/12

U.S. Cl. 214—621 **16 Claims**



1. An attachment for selectively converting a transportive squeeze truck to a fork lift truck, the squeeze truck having a pair of horizontally spaced squeeze members, means for selectively urging the squeeze members together to hold an object to be carried therebetween and means for lifting the squeeze members to lift the load carried therebetween, said attachment comprising: a box frame having a bottom portion adapted to stand on a support surface, said frame being constructed to prevent destructive squeezing deformation thereof by the squeeze members of a squeeze truck to permit the frame and a load thereon to be carried for transport by the truck; fork means movably carried by the frame substantially above said bottom portion to extend in a lift position horizontally therefrom a preselected distance above the support surface for disposition under a load to be lifted and transported by the truck for placement of the bottom portion on the support surface with the load supported at said preselected distance above the support surface; means for selectively retaining the fork means in a retracted position; support means on said frame arranged to overlie a portion of the truck squeeze members when the squeeze members are caused to engage the sides of the frame for squeezingly gripping the frame, whereby said support means provide a positive stop limiting movement of said frame downwardly between the squeezing members during a load carrying operation; and means on a rear portion of said frame defining an upwardly turned hook for hooking under a load to be lifted and transported by the truck.

4,013,186

TIRE PRESS UNLOADER

Dale S. Barton, Columbiana; Ben Stoyanov, Akron, both of Ohio, and Robert M. Staats, Beaver Falls, Pa., assignors to NRM Corporation, Akron, Ohio

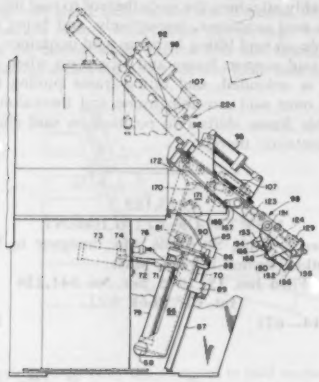
Filed Dec. 24, 1974, Ser. No. 536,252

Int. Cl.² B65G 61/00

U.S. Cl. 214—660 **33 Claims**

1. A tire unloader for a tire press of the type including a stationary bottom mold section and a movable top mold section, the latter being movable to open and close the press, said unloader comprising a platform having a proximal and distal end, an elevator stanchion pivotally supporting said platform at its proximal end, said stanchion being pivotally mounted for

swinging the platform above the bottom mold section when the press is open, support means underlying the distal end of said platform to rigidify the same when thus in position to



receive the tire, and means responsive to the pivoting of said stanchion to move said support means to and from an operative position.

4,013,187

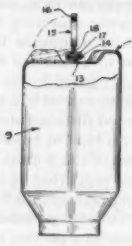
HANGER CONSTRUCTION FOR SEMIRIGID PLASTIC CONTAINER

Harold Anthony Betka, Waukegan, Ill., assignor to Abbott Laboratories, Chicago, Ill.

Filed May 28, 1974, Ser. No. 473,609

Int. Cl.² B65D *23/00*

U.S. Cl. 215—100 A **7 Claims**



6. A plastic container having an integral base, an elongated, inverted, substantially T-shaped rib integral with and depending from said base, and a loop integrally joined to an elongated, substantially C-shaped bar complementary to and slidably affixed onto said T-shaped rib.

4,013,188

INDUCTION SEALED CLOSURE

George C. Ray, Battle Creek, Mich., assignor to General Foods Corporation, White Plains, N.Y.

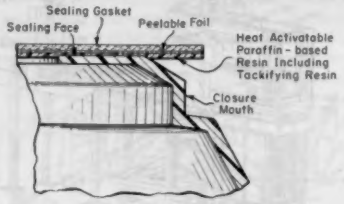
Filed Mar. 1, 1973, Ser. No. 337,023

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B65D *53/04, 53/06*

U.S. Cl. 215—347 **9 Claims**

1. In an improved hermetically sealed package, an hermetic closure in combination comprising a closure mouth having a closure face, said face having a synthetic organic thermoplastic of a first melting point, and an abutting sealing membrane sealed to said closure face consisting essentially of an electrically conductive foil ply less than 5 mils thick having a frangible paraffin-based wax ply coated thereon, said wax ply having a melting point less than the first melting point and having been heated to above its own melting point but less than said first melting point while in abutting face-to-face pressure contact with said closure face and forming a continuous caulking seal with said face, said wax ply having been caused to flow in the region of abutment and being deformed to caulk the



sealing face of the closure, said wax ply having a tackifying agent present in a minor weight percent thereof, the tensile strength of the wax ply being less than 60 psi and less than that of said synthetic organic thermoplastic material of said face whereby the ply is operative to fail in a cleavage pattern in the coating per se.

4,013,189

INSULATION SYSTEM FOR LIQUIFIED GAS TANKS

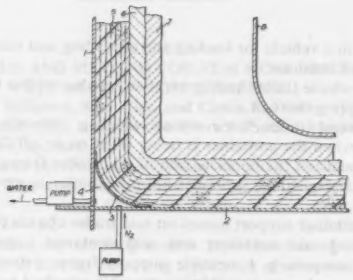
Roger Cambridge Ffooks, Tittlesfold Farm near Billingshurst, England, assignor to Conch, Lng, Moorestown, N.J.

Filed Aug. 7, 1975, Ser. No. 602,807

Claims priority, application United Kingdom, Aug. 8, 1974, 35094/74

Int. Cl.² B65D *8 7/24*

U.S. Cl. 220—9 LG **7 Claims**



1. A thermally-insulating container comprising in combination;

a. at least two adjacent metallic walls defining an angular corner;

b. a load-bearing metallic corner plate extending across and spaced from said angular corner, said plate (i) being resiliently flexible; (ii) having a concavely curved surface; and (iii) being rigidly attached by welding to the said at least two adjacent walls along its edges; and

c. an inner lining of a thermally insulating material which is (i) a foamed plastic (ii) applied directly onto said walls and said corner plate.

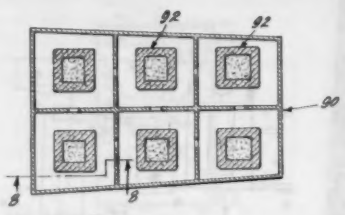
4,013,190
FLAME ARRESTING AND EXPLOSION ATTENUATING SYSTEM

Edwin W. Wiggins, Bridgeton, and Quentin C. Malmberg, Ferguson, both of Mo., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Continuation-in-part of Ser. No. 252,104, May 10, 1972, abandoned. This application June 27, 1974, Ser. No. 483,940

Int. Cl.² B65D *1/24*; **B64D** *37/08*

U.S. Cl. 220—22 **1 Claim**



1. An inerting tank construction for containing ignitable fuels which may exist simultaneously therein in a liquid phase and a gaseous phase comprising a structural enclosure, partition means in said structural enclosure dividing the interior thereof into a plurality of individual fuel cells, said partition means having at least one transfer aperture between each pair of adjacent fuel cells to permit fluid communication therebetween so that all of the cells in said enclosure are in communication with each other, and a relatively porous hollow member located in each of said fuel cells further to divide said cells into distinct cell portions, each of said porous members being formed of an open celled material having a pore size and pore density to permit relatively unrestricted liquid and gas flow therethrough and prevent substantial pressure differential from appearing thereacross, at least one of said porous members being located in each associated fuel cell in position to be spaced from all of the partition means which form the said associated fuel cell.

4,013,191
LOCKABLE CLOSURE CAP

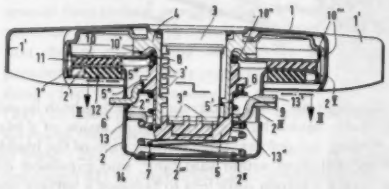
Theodor Gerdes, Langenfeld, Germany, assignor to Blau KG Fabrik fur Kraftfahrzeugteile, Langenfeld, Germany

Filed Sept. 16, 1975, Ser. No. 613,830

Claims priority, application Germany, Sept. 18, 1974, 2444477

Int. Cl.² B65D *51/16*, *55/14*

U.S. Cl. 220—203 **11 Claims**



1. A lockable closure cap for containers and the like, comprising a cap unit; a cylinder lock mounted on said cap unit for rotation relative thereto about an axis between a locking and an unlocking position; a hollow cylindrical element surrounding and connected to said cylinder lock for shared rotation therewith and having an eccentric outer collar; a locking ring having a catch projection which extends radially thereof, supported on said eccentric outer collar, and retained in said cap unit against rotation about said axis but with freedom of movement substantially radially of said axis in response to the rotation of said eccentric outer collar so that said catch projection moves between an extended and a retracted position as said cylinder lock rotates between said locking and unlocking position; and sealing means interposed between said cylindrical element and said cap unit and operative for preventing the contents of the container from penetrating into and escaping through said cylinder lock.

4,013,192
PILL COUNTER

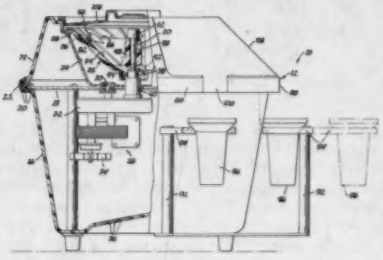
Austin E. Pillon, Sandwich West, Canada, assignor to ITL Industries, Inc., Newark, Ohio

Filed Feb. 18, 1976, Ser. No. 658,984

Claims priority, application United Kingdom, May 5, 1975, 18766/75

Int. Cl.² B65G *47/44*; **B65B** *57/20*

U.S. Cl. 221—7 **13 Claims**



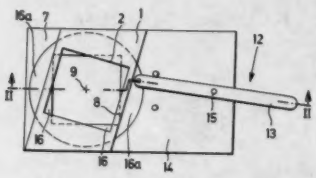
1. Apparatus for counting and dispensing pills and the like comprising: a housing; a vertical shaft rotatably mounted in said housing; a pill bowl fixedly mounted on said shaft for rotation therewith; said bowl having a lower portion for receiving pills from a stock bottle, an intermediate annular ledge above the lower bowl portion, and an upper annular edge above the annular ledge; means for selectively rotating said bowl; a stationary guide received within the bowl to guide the pills from the lower bowl portion upwardly to the annular ledge during bowl rotation and then along the ledge in single file and upwardly over the upper annular edge, said stationary guide having a central hub rotatably receiving said vertical shaft; a head detachably mounted in said shaft at the upper end thereof for engaging said hub and preventing axial displacement of said guide from said shaft, an exposed, generally Y-shaped slide on the housing including a main slide portion for receiving the pills guided over the bowl edge and a pair of branch slide portions constituting prescription bottle and stock bottle slide portions; said branch slide portions having a common junction with the main slide portions so as to receive pills therefrom and to guide the pills to prescription or stock bottles, respectively; each of said slide portions having an exposed channel shape with a bottom wall and a pair of side walls with the bottom walls of said branch portions being continuous with the bottom wall of the main slide portion from said common junction to permit the slide portions to be cleaned with a continuous wiping motion; each of said slide portions having a downwardly inclined orientation with an exposed channel shape so pills slide downwardly therethrough in a guided manner during use of the apparatus; means defining a stop edge at the inlet end of said main slide portion; said guide having a tongue portion that projects over the edge of said bowl into engagement with said stop portion to prevent rotation of said guide during rotation of said bowl and vertical shaft; a gate mounted at the common junction of the main slide portion with the prescription and stock bottle slide portions so as to selectively guide the pills from the main slide portion to either the stock or prescription bottle said portion; and control means for sensing the number of pills that have

passed through the main slide portion and for positioning the gate to guide the pills to the prescription bottle slide portion until a predetermined number of pills have been sensed and then to the stock bottle slide portion.

4,013,193
APPARATUS FOR DISPERSING PLANAR NON-CIRCULAR OBJECTS

Johannes Lorsch, An der Bleiche 49, D-4172 Straelen, Germany

Filed Sept. 16, 1975, Ser. No. 613,736
Claims priority, application Germany, Sept. 23, 1974, 2445338
Int. Cl.² B65G *59/00*
U.S. Cl. 221—264 **6 Claims**



1. Apparatus for dispensing single, essentially planar, non-circular, uniform, articles stacked in a delivery shaft including a dispensing mechanism arranged below said delivery shaft, said dispensing mechanism comprising a rotary valve having an aperture for receiving a lowest one of said articles, said valve being rotatable about a center axis of said delivery shaft; a base member disposed below said rotary valve, each of said delivery shaft and said base member having an aperture corresponding in shape to each other and to the articles being dispensed, said delivery shaft aperture and said base member aperture being angularly displaced relative to each other along said center axis; said base member having a center, said base member aperture being located to one side of the center of said base member; and a crank assembly linked to said rotary valve for providing reciprocating movement of said rotary valve between a first position aligned with said delivery shaft aperture and a second position aligned with said base member aperture; said crank assembly including an arm having one end linked to said rotary valve, and a free end extending beyond said base member, an intermediate portion of said arm being pivoted on a pin attached to said base member and located to the opposite side of the center, reciprocating movement of said free end of said arm remote to said rotary valve thereby imparting opposite reciprocating movement of said valve.

4,013,194
DEVICE FOR METERING BY WEIGHT THE DELIVERY OF LIQUIDS

Filippo Moscarini, Rome, Italy, assignor to I.S.A.M. Istituto Sperimentale Auto e Motori S.p.A., Anagni (Frosinone), Italy

Filed May 13, 1975, Ser. No. 577,131
Claims priority, application Italy, May 14, 1974, 50985/74
Int. Cl.² B67D *5/38;* **G01F** *1/86*
U.S. Cl. 222—23 **8 Claims**

1. A device for measureing delivery of liquid by weight which eliminates the necessity for weighing a container comprising:

a container for said liquid and an electrically controlled valve controlling the flow of said liquid to said container,

a delivery aperture in said container for delivery of said liquid,

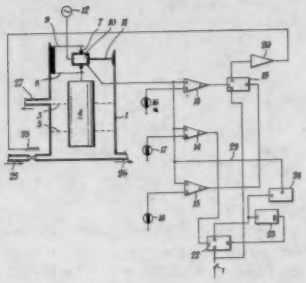
a metering body immersed in said liquid,

means supporting said metering body for limited movement in response to changes in liquid level in said container,

a mechanical-electrical transducer coupled to said metering body and producing electrical signals related to the movement of said metering body,

comparator means connected to said transducer producing a plurality of distinctive electrical signals when said body is in a corresponding plurality of distinctive positions as a result of various levels of said liquid,

a bi-stable device coupled to the output of said comparator means controlling the condition of an amplifier for operating said electrically controlled valve,

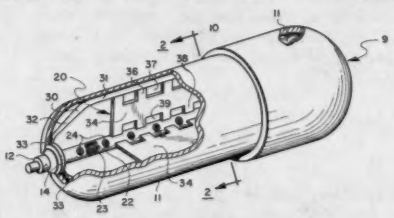


a second bi-stable device also coupled to the output of said comparator means, a timer for timing out a predetermined period in response to operation of said second bi-stable device and a digital indicator driven by said transducer when said timing means is timing out said predetermined period whereby the condition of said digital indicator at the conclusion of said predetermined period indicates the rate of liquid delivery.

4,013,195
EXPULSION BLADDER

DeLacy F. Ferris, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 18, 1975, Ser. No. 550,408
Int. Cl.² B65D *35/28*
U.S. Cl. 222—95 **5 Claims**



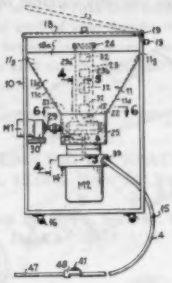
1. A liquid expulsion tank device containing both liquid and gas, said tank device having a framework inside of a bladder for controlling the deformation configuration of the bladder as it is being collapsed within said tank, said expulsion device further having a screen sufficient to produce a surface tension barrier to block passage therethrough of said gas, the improvement which comprises:

means to keep a constant cumulative liquid and inert gas volume in said bladder prior to liquid expulsion from said tank whereby an ullage gas bubble within said bladder is greater than the pressure of the atmosphere surrounding said expulsion device to maintain said bladder pressed out against the interior walls of said tank to prevent bladder flexure during tank temperature cycling and liquid sloshing.

4,013,196
PNEUMATIC DISPENSING APPARATUS FOR FINELY DIVIDED DRY SUBSTANCES

Amos Hines, Jr., 506 Franklin St., Forrest City, Ark. 72335

Filed June 2, 1975, Ser. No. 582,887
Int. Cl.² B65G 53/40
U.S. Cl. 222—193 2 Claims



1. Portable apparatus for pneumatically distributing finely divided substances such as dry powdered or granulated chemicals, comprising:

a hopper (11) for normally supporting a bulk of said substance, said hopper having a restricted discharge opening (20) at its lower portion through which the substance tends to flow by gravity;

means (23) movable transversely of said opening (20) for agitating said substance;

a housing (35) having an inlet opening (38) a discharge opening (39) and having a fan therein;

an imperforate conduit (25) connecting said hopper discharge opening to said housing inlet opening (38);

said hopper opening, conduit, fan and housing inlet opening being axially and vertically alined to cause the substance to be conveyed in a rectilinear path from said hopper to said fan under the concurrently acting forces of gravity, agitation and air suction;

said hopper (11) comprising a plurality of connected trapezoidal plate sections (11*c*, 11*d*, 11*e*, 11*f*) of an inverted truncated pyramid;

said agitating means comprising an elongated dasher plate (23) extending upwardly from said discharge opening in spaced face-to-face position relative to one of said plate sections (11*f*), the opposite lateral edges (23*a*, 23*b*) of said dasher plate being respectively spaced from the proximate faces of the pyramidal trapezoidal plate sections (11*c*, 11*d*) connected to said last-named section (11*f*) to thereby permit the bulk substance to laterally surround the dasher plate;

said plate (25) being provided with longitudinally spaced openings (32) through which said substance is adapted to flow back and forth as the plate oscillates,

means (24) for mounting said plate for oscillation about its upper end;

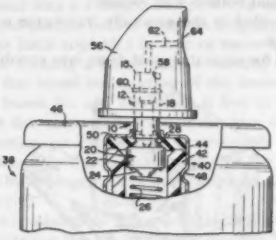
means (33) for yieldingly biasing said plate for movement toward said last-named section (11), and

means including said biasing means (33) for oscillating said dasher plate to alternately press the substance on one side thereof against said last-named plate section (11*f*) and to laterally displace the substance on the other side thereof away from the latter plate section, respectively.

4,013,197
DOUBLE SEAL VALVE STEM

Ronald F. Ewald, Rolling Meadows, Ill., assignor to Seaquist Valve Company, Div. of Pittway Corporation, Cary, Ill.

Continuation of Ser. No. 264,204, June 19, 1972, abandoned.
This application Sept. 10, 1975, Ser. No. 611,862
Int. Cl.² B65D 83/14
U.S. Cl. 222—402.24 6 Claims



1. A double seal cleaning action valve stem in combination with a valve assembly for an aerosol dispenser, said valve stem comprising:

an elongated portion having a cavity formed therein, said valve stem further comprising an enlarged portion integrally attached to said elongated portion and at least partially defined by a diameter greater than the elongated portion; an annular beveled surface disposed in interconnecting relation between said enlarged portion and said elongated portion and inclined outwardly from the base of said elongated portion to said enlarged portion, an annular groove located between said elongated portion and said enlarged portion and extending radially inwardly into said valve stem; a dispensing port formed in a side wall of said elongated portion in communicating relation to said cavity; said valve assembly including a resilient sealing gasket having an aperture formed therein, the side wall of said aperture defining an inner peripheral surface of said sealing gasket, said stem fitted through said aperture so as to movably engage said inner peripheral surface; the outer peripheral portion of said sealing gasket affixed to a remaining portion of said valve assembly such that said inner peripheral surface flexibly engages said valve stem, said sealing gasket normally disposed in a double sealing engagement with both said side wall of said elongated portion and said annular beveled surface to force said sealing gasket radially inwardly into said annular groove, said enlarged portion including a sealing ledge arranged relative to said annular beveled surface and said annular groove to facilitate forcing said sealing gasket into said annular groove thereby defining a seal between said inner peripheral surface and said valve stem; said dispensing port normally disposed in isolated relation, beyond said sealing gasket relative to the aerosol dispenser, whereby movement of said valve stem into said valve assembly causes wiping action of said inner peripheral surface over said dispensing port and said elongated portion.

4,013,198
MEASURING DISPENSER

Frank C. Miklas, Allentown, Pa., assignor to General Electric Company, Bridgeport, Conn.

Filed July 28, 1975, Ser. No. 599,409
Int. Cl.² G01F 11/46
U.S. Cl. 222—438 14 Claims

1. A measuring dispenser comprising:

a. a canister having bottom wall means;

b. a first curved guide positioned at said bottom wall means;

c. a second curved guide positioned at said bottom wall means in line with the first curved guide;

d. an enlarged opening provided in the bottom wall means of said canister between the first and second curved guides;

e. a rotatable dispensing drum having a generally transverse wall and an enclosing side wall, said dispensing drum being positioned for rotational movement within said curved guides;

f. an enlarged dispensing aperture formed in the enclosing side wall of said drum for cooperation with the enlarged opening formed in said bottom wall means;

g. a slot provided in the generally transverse wall of said dispensing drum;

h. a partition for separating said drum into variable measuring chambers, the partition including a generally longitudinal member having a width slightly less than the inside diameter of said generally cylindrical drum and a generally transverse wall formed at one end of said partition, said partition being inserted within said drum with the longitudinal member extending through the slot in the transverse wall of the drum whereby variable measuring chambers are formed between the transverse wall of the drum and the transverse partition wall; and

i. means connected to the portion of the longitudinal member that extends through the slot in the transverse wall of the drum for moving the transverse partition wall toward and away from the transverse wall of the dispensing drum whereby to vary the volume of the measuring chambers that are provided between the transverse walls.

4,013,199

MEASURING DISPENSER

Richard N. Brown, Macungie, Pa., assignor to General Electric Company, Bridgeport, Conn.

Filed July 28, 1975, Ser. No. 599,410

Int. Cl.² G01F *11/34*

U.S. Cl. 222—438 **15 Claims**

1. A measuring dispenser comprising:

a. a canister having bottom wall means;

b. a first curved guide positioned at said bottom wall means;

c. a second curved guide positioned at said bottom wall means in line with the first curved guide;

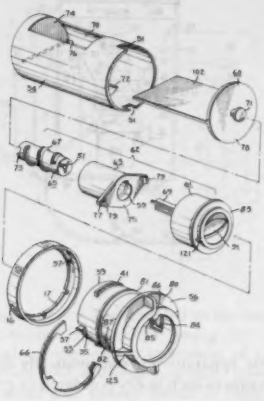
d. an enlarged opening provided in the bottom wall means of said canister between the first and second curved guides;

e. a rotatable dispensing drum having a transverse wall and an enclosing side wall, said dispensing drum being positioned for rotational movement within said curved guides;

f. an enlarged dispensing aperture formed in the enclosing side wall of said drum for cooperation with the enlarged opening formed in said bottom wall means;

g. a slot provided in the transverse wall of said dispensing drum;

h. a partition for separating said drum into variable measuring chambers, the partition including a generally longitudinal member having a width slightly less than the inside diameter of said drum and a transverse wall formed at one end of said partition, said partition being inserted within said drum with the longitudinal member extending through the slot in the transverse wall of the drum and the transverse partition wall being positioned within the other end of said drum whereby variable measuring chambers



are formed between the transverse wall of the drum, the longitudinal partition member and the transverse partition wall; and

i. means for moving the partition including the longitudinal member and the transverse partition wall in order to move the transverse partition wall toward and away from the transverse wall of the dispensing drum whereby to vary the volume of the measuring chambers that are provided between the transverse walls and the longitudinal member, the longitudinal partition member being slidable in the slot of the transverse wall of the drum as the transverse partition wall is being moved.

4,013,200

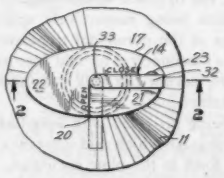
DISPENSING CLOSURE

Alan R. Tripp, New York, N.Y., assignor to Ventura Product Development Corporation, Elmsford, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,815

Int. Cl.² B65D *25/46*

U.S. Cl. 222—534 **7 Claims**



1. A dispensing nozzle device comprising a closure defining body member attachable to the discharge opening of a receptacle so that an interior face of said body member is exposed to the interior of said receptacle, said body member including an oval top face having a quadrant recess formed therein extending to the periphery of said top face and delineated by vertical shoulders extending along the major and minor axes of said top face, a longitudinally extending tubular nozzle

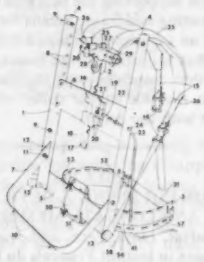
member having a first port at its proximal end and a discharge opening at its distal end, and means pivotally supporting said nozzle member for swinging in a horizontal plane in said recess about a vertical axis at the proximal end of said nozzle member and at the center of said top face at a point proximate the juncture of said shoulders between a retracted first position and an extended second position, said body member having a second port formed therein lying in the path of said first port and communicating with said body member interior face and said ports being out of registry and in registry when said nozzle member is in its first and second position respectively, and the distal end of said nozzle member lying within the periphery and projecting beyond the periphery of said body member when said nozzle member is respectively in its first and second positions.

4,013,201

FATIGUE REDUCING BACKPACK HARNESS

Glenn James Potter, 1332 S. Hope St., No. 302, Los Angeles, Calif. 90015

Filed Jan. 26, 1976, Ser. No. 652,466
Int. Cl.² A45F *3/14*
U.S. Cl. 224—25 A **6 Claims**



1. An adjustable pack frame assembly for mounting on a person's back for carrying a load thereon, comprising:

a frame proper including right and left side bars rigidly connected near their lower ends to a lower crosspiece, an upper crosspiece to which said side bars are adjustably fastened higher up to accommodate the size of the wearer as by a pair of bolts and wing nuts on each side fitting selected holes in a row along each side bar, and means for attaching a knapsack or other container or burden to said side bars,

a stand-up prop making the entire backpack free-standing, consisting of a U-shaped foot piece pivotally attached near its ends to the lower portions of the side bars by two spring-washer loaded bolts, the ends of the arms of said foot piece diagonally shaped terminally beyond the bolts so as to impinge on portions of said side bars and limit unfolding of said foot piece when it is brought far enough back to brace the loaded backpack upright,

a shoulder suspension means consisting of:

said upper crosspiece,

left and right shoulder hooks, each a strip of flat lightweight hard resilient material such as hard aluminum given a curve convex upward and adjustably fastened to said upper crosspiece canted outward to fit the shoulder, each said hook padded on the underside, the pad secured to said hook by stitch-lacing whereby a strong strand or multiple strong strands are passed as stitches through the pad then as lacing through rows of small holes alongside the edges of the hard material, said rows being staggered to conserve hook strength, and said hook covered with a tubular waterproof material such as leatherette and having its ends made small and snug by tucking and/or purse-stringing,

two flexible straps pivotally attached to the forward ends of said shoulder hooks and ending in quickly-adjustable levered buckles, and

two flexible straps, each pivotally secured low and laterally on said frame and engageable in a said shoulder hook buckle for stabilizing the load and modifying the curvature of said shoulder hook for best fit,

a hip-girdling member for carrying a substantial portion of the load, consisting of:

a broad flat semi-rigid plate such as hard aluminum formed into a C-shape except where remaining flat in its mid-portion behind whereon is rigidly attached close to its back (outside) by one or more spacers a broad plate forming a broad narrow vertical slot into which the flat broad mid-portion of the lower crosspiece of the frame fits and wherein it is free to relatively rock with the vertical motions of the hips during walking, climbing, or cycling, on a removable pivot running horizontally through the middle of the assembly, limited by impingement of the crosspiece on said spacer or spacers,

a quickly-adjustable levered buckle and strap means for completing the hip-girdling C-piece in front and nonconstrictively fitting that member to the user's upper pelvis,

a pad, waterproof on the outside, for the lower edge of and the inside of each arm of the semi-rigid C-piece, said pad being thicker along the top and of a curving wedge-shape and extending upward as a thin narrow flange, also downward similarly as a thin broad flange to curl around the lower edge of said C-piece, said flanges being secured by the said stitch-lacing technique to said C-piece in two rows of staggered holes,

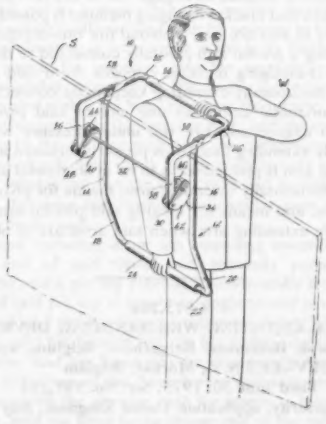
a fitted wrap-around waterproof cover for the pivot means bearing inside a post-sacral pad in its front portion and enclosing a grease-absorbing dust cover, said waterproof cover made in the form of a flexible flattened tube having grommets along its sides so it can be laced on the hip-girdling member at the back around said pivoted deep slot means, the laces when drawn and tied holding said waterproof cover in position;

4,013,202

DEVICE FOR CONVENIENTLY LIFTING AND TRANSPORTING A LARGE SHEET OF MATERIAL

Herman J. Russo, 209 Scribner Ave., Norwalk, Conn. 06854

Filed Mar. 2, 1976, Ser. No. 663,063
Int. Cl.² B65D *71/00*
U.S. Cl. 224—45 M **2 Claims**



1. A carrying device arranged to permit a workman to easily lift and transport large sheets of construction material such as plywood, wallboard and the like, comprising:

a substantially U-shaped lower frame member having arms defining a plane against which a sheet of material may be placed and a crossbar, offset from said plane, forming a lower lifting region;

a substantially U-shaped upper frame member joined to the lower frame member and having a crossbar offset from said plane and forming an upper lifting region and having mounting arms adjacent to said plane;

cam means mounted eccentrically upon said mounting arms adjacent said plane, said cam means gravitationally rotating into gripping engagement with a sheet of material placed against said plane, and being rotated into tighter gripping engagement by gravitational forces exerted on the sheet of material as the frame members are lifted upwardly;

the cam means including a pair of cams mounted opposite the lower frame arms and rotatable into engagement therewith, the cams being joined for tandem motion by a connecting rod.

4,013,203

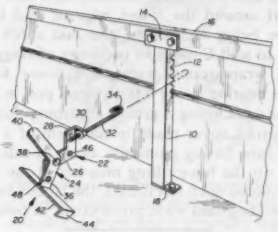
LOCKABLE TIRE CARRIER

Willard Mack McCauley, Rte. 1, Box 230, Okolona, Ark. 71962

Filed May 8, 1975, Ser. No. 575,616

Int. Cl.² B62D *43/08*

U.S. Cl. 224—42.24 **4 Claims**



1. Apparatus for securing a spare tire to the bed of a pickup truck or the like wherein said tire is mounted on a flanged rim having an opening therethrough which comprises a vertically disposed bracket member having vertically spaced notches therein and attachable to said bed; a horizontally extending length adjustable bracket-engaging member having a hook at one end thereof adapted to engage one of the notches of said bracket when said bracket engaging member is passed through the opening in said tire rim; a pivotal tire rim-engaging member including a pivotal arm pivotally connected to the end of said bracket-engaging member opposite from said one end thereof, a horizontally extending keeper bar connected adjacent its horizontal center to one end of said pivotal arm adapted to engage said tire rim under pressure when said horizontally extending bracket is properly adjusted and when said pivotal arm is pivoted so as to be in horizontal alignment with said horizontally extending arm; means for pivoting said pivotal arm; and means for locking said pivotal arm to said horizontally extending arm when said arms are in horizontal alignment.

4,013,204

SELF-ADJUSTING WEB-HANDLING DEVICE

Albert Joseph Hellemans, Borgerhout, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed June 30, 1975, Ser. No. 591,314

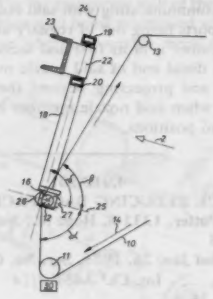
Claims priority, application United Kingdom, July 1, 1974, 29118/74

Int. Cl.² B65H *25/26*

U.S. Cl. 226—21 **4 Claims**

1. A self-adjusting web-handling device for providing even tension across a continuously moving web which is conveyed by guide means to come into engagement with said handling device along an upstream approach plane and to leave said device along a downstream exit plane at a defined included angle to said approach plane, said device comprising:

a roller mounted for free rotation and engagement by said web,



frame means for supporting the bearings of said roller, pivot means supporting said frame means for free pivotal movement about an axis that is situated halfway the length of the roller, that is normal to the bisector of said included angle, and that coincides with the tangent to the periphery at the side of the roller where the web is in engagement with the roller.

4,013,205

GRIPPING SHOE EQUIPPING A DEVICE FOR PULLING AN ELONGATE MEMBER

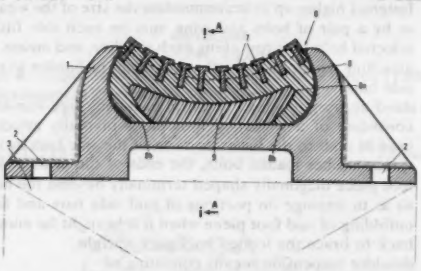
Michel Fabre-Curtat, Lima, Peru, and Jean Thiery, Le Pecq, France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf, France

Filed June 16, 1975, Ser. No. 586,932

Claims priority, application France, June 18, 1974, 74.21550

Int. Cl.² B65H *17/34*

U.S. Cl. 226—173 **8 Claims**



1. A gripping shoe which is to be secured to a pulling device to enable said pulling device to pull an elongated member by providing traction between said device and said elongated member comprising, in combination:

a rigid casing provided with means for securing said casing to the pulling device, said casing being open on a side opposite said securing means; and

a deformable element housed in said casing and provided with wear-resistant friction means for contacting the elongated member, wherein said deformable element has a composite structure comprising

a body member provided with a large internal recess, said

body member carrying said wear-resistant friction means and being at the same time deformable, of low elasticity, and mechanically resistant, and

a sole member of a highly deformable, elastic and substantially incompressible material, said sole member being housed in said recess and filling substantially the whole volume thereof.

4,013,206

ADJUSTABLE OUTWARD CLINCH ANVIL ASSEMBLY

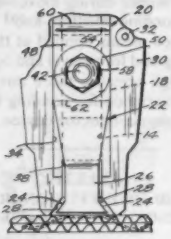
Walter G. Lemos, East Providence, R.I., assignor to Textron, Inc., Providence, R.I.

Filed Jan. 13, 1975, Ser. No. 540,703

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.² B27F 7/16

U.S. Cl. 227—83 **10 Claims**



1. A stapling device comprising a housing defining a drive track, a staple magazine for receiving a supply of staples in stick formation and feeding successive leading staples laterally into the drive track, a staple driving element slidably mounted in said drive track through a drive stroke to drive a leading staple within said drive track outwardly thereof into a workpiece and a return stroke, the outer end of said drive track being defined by outwardly diverging side wall surfaces, said housing including a keyway formed in the exterior thereof parallel with said drive track, a spring metal anvil member having a fixed end portion slidably mounted within said keyway, said anvil member including a free end portion normally extending within the outward end of said drive track, the free end portion of said anvil member having a pair of outwardly diverging side wall surfaces cooperating with said diverging drive track side wall surfaces for deflecting the legs of a staple outwardly during the driving movement thereof and a cam surface engageable during the last portion of the staple driving element drive stroke to cam said free end portion outwardly of said drive track and enable the staple crown to move thereby during the last part of the driving movement of the staple, and means for fixedly securing the fixed end portion of said anvil member in any one of a multiplicity of adjusted positions within said keyway comprising:

a threaded stud extending from said housing outwardly through said keyway, the fixed end portion of said anvil member having a cam follower opening formed therein through which said stud extends,

a generally rectangular plate having an opening therein through which said stud extends, said plate being disposed in backing relation to the fixed end portion of said anvil member and including an inwardly bent end portion extending beyond said anvil member within said keyway throughout the width thereof and an opposite end portion extending throughout the width of said anvil member providing a flexure surface therefor,

an adjusting member rotatably mounted on said stud, said adjusting member including an inner cam portion disposed within the cam follower opening of said anvil member of a shape relative thereto such as to effect a displacement of said anvil member along said keyway in response to the rotational displacement of said adjusting member, an outer knob portion for manually effecting rotational displacement of said adjusting member, and an intermediate portion disposed within the opening in said plate, and

a locking nut threadedly engaged on the outer end of said stud for maintaining said adjusting member in any position of rotational displacement and said anvil member in a fixed position within said keyway corresponding thereto.

4,013,207

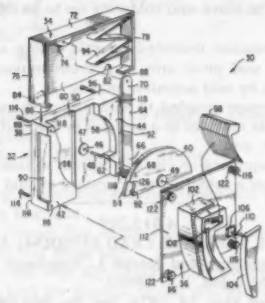
CURVED PIN AND INSERTER

Kenneth B. ErkenBrack, Charlottesville, Va., assignor to New Products, Inc., Charlottesville, Va.

Division of Ser. No. 556,241, March 7, 1975, Pat. No. 3,952,935, which is a continuation-in-part of Ser. No. 464,382, April 26, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 652,959

Int. Cl.² B25C 1/02

U.S. Cl. 227—120 **2 Claims**



1. A curved pin usable in an inserter apparatus which inserts said curved pin to a workpiece, the inserter having a body defining a substantially circular path for said pin to follow with the path terminating at an opening in the body through which said pin passes for insertion into the workpiece; a drive plunger rotatably mounted in the body, the drive plunger being provided with a pin head engaging receptacle; means to drive the plunger along the circular path; and means for supplying pins to the circular path, said pin comprising:

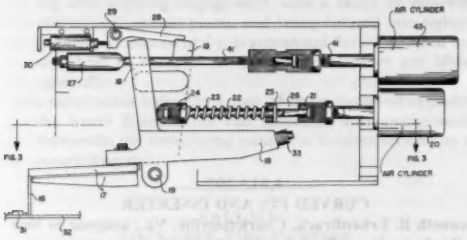
a curved shank, said shank being continuously curved to form substantially an arc of a circle and having substantially the same curvature as the circular path in the inserter body; and,

a pin head including a pin top extending inwardly from a first end of said shank and generally perpendicular thereto and a pin leg extending downwardly from a free end of said pin top at an obtuse angle to said pin top, said pin top and pin leg forming retaining means adapted to retain said pin head in the pin head engaging receptacle whereby said pin head may be engaged by the plunger upon actuation of the drive means and said pin may be driven along the circular path for insertion into a workpiece, said pin head being planar and of the same thickness as, and lying in the plane defined by said shank, the entire head extending radially inwardly toward the center of the circle defined by the arc of said shank.

4,013,208
SOLDERING MECHANISM FOR SOLDERING ELECTRONIC COMPONENT LEADS TO CONDUCTORS ON A PRINTED CIRCUIT BOARD, AND THE LIKE

Richard Storrs Mason, Escondido; Robert Edward Bible, Rancho Santa Fe, and James Robert Beach, Encinitas, all of Calif., assignors to The Singer Company, Little Falls, N.J.

Filed Mar. 8, 1976, Ser. No. 664,775
Int. Cl.² H01L *21/60*
U.S. Cl. 228—44.1 A **9 Claims**



1. A mechanism for soldering electronic component leads to conductors on a printed circuit board, or the like, said mechanism comprising:

a first soldering head assembly including a support frame;

at least one pivot arm pivotally mounted on said frame;

a soldering tip mounted on one extremity of said pivot arm;

first actuating means mounted on said frame in position to engage said pivot arm and to turn said pivot arm in a first direction to move said soldering tip to an operative position;

a tripper member mounted on said frame and normally engaging said pivot arm to prevent movement of said pivot arm by said actuating means;

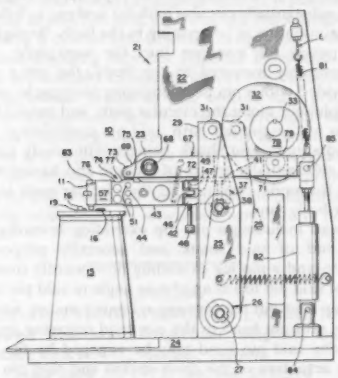
operating means coupled to said tripper member to move said tripper member to a position in which it releases said pivot arm; and

means for supplying an electric current to said soldering tip to establish a soldering temperature at said tip.

4,013,209
HIGH FORCE FLEXIBLE LEAD BONDING APPARATUS

Thomas L. Angelucci, and Joseph L. Angelucci, both of P.O. Box 604, Cherryhill, N.J. 08003

Filed Mar. 24, 1976, Ser. No. 669,984
Int. Cl.² H01L *21/603*
U.S. Cl. 228—44.1 A **13 Claims**



1. A high force bonding system for a gang lead bonder comprising:

a rigid frame,

a bonding station for supporting a semiconductor device,

means for positioning a flexible printed circuit juxtaposed a semiconductor device on said bonding station,

a vertical support lever pivotally mounted on said rigid frame,

a horizontal support lever pivotally mounted on said vertical support lever,

a thermode holder mounted on said horizontal support lever for receiving a removably mounted thermode therein,

a force lever pivotally mounted on said fixed frame,

said force lever comprising a short force arm and a long lever arm,

a roller follower at the end of said force arm for applying a downward force to said thermode holder,

means for moving said horizontal support lever and said thermode holder from a retracted position to a bonding position,

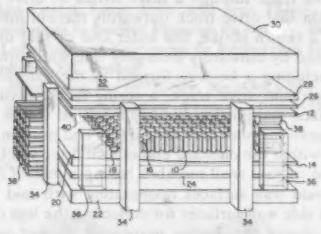
first cam means operably connected to said horizontal support lever for engaging said roller follower for depressing said thermode holder during movement from a retracted position to a bonding position, and

high pressure force means applied at the end of said force arm for rotating said force level and operably transmitting a multiplied high pressure force through said roller follower to said thermode for bonding said flexible printed circuit to said semiconductor device.

4,013,210
METHOD OF DIFFUSION BONDING

Czeslaw Deminet, 26037 Marine View Drive S., Kent, Wash. 98031

Continuation of Ser. No. 282,595, Aug. 21, 1972, abandoned. This application Sept. 26, 1974, Ser. No. 509,417
Int. Cl.² B23K *19/00*
U.S. Cl. 228—106 **9 Claims**



1. A method of making a diffusion bonded composite metallic structure of a material selected from a group consisting of titanium and titanium based alloys, comprising a panel portion having a relatively fragile cellular core and a load carrying portion connected to said panel portion, said method comprising:

a. providing a cellular core component having a plurality of cellular core elements and having at least one bonding face made up of said cellular core elements,

b. providing at least one face sheet component having a substantially planar bonding surface,

c. providing a load carrying component having at least one planar bonding surface,

d. forming a substantial vacuum at said bonding face and said bonding surfaces,

e. heating said bonding face and said bonding surfaces at a temperature sufficient and for a time period sufficient to remove substantial surface contamination therefrom, while maintaining said bonding surfaces and bonding face sufficiently exposed to permit escape of contamination from said bonding surfaces and said face as gases, so as to make said surfaces and said face substantially uncontaminated,

f. bringing the components to a bonding temperature and urging the bonding surface of said face sheet into contact

with the bonding face of said core component and said bonding surface of said load carrying component in a desired configuration by pressing a compliant medium against the opposed surface of said face sheet, the resulting contact pressure of the surface of said sheet against the surface of the load carrying component being no more than 10 pounds per square inch and the contact pressure of said sheet against said bonding face being less than a pressure level which would cause significant deformation of said cellular core component, and with sufficient heat and pressure and for a sufficient period of time to simultaneously cause diffusion bonding of said components to make said composite structure.

4,013,211

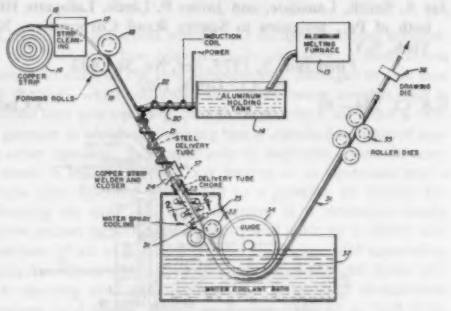
METHOD OF FORMING A CLAD WIRE

Jay W. Atman, 401 Manordale Road, Pittsburgh, Pa. 15241

Filed Apr. 5, 1976, Ser. No. 673,795

Int. Cl.² B23P *3/14*

U.S. Cl. 228—126 **23 Claims**



1. A method of forming an elongated clad metal product comprising the steps of:

forming a strip of first metal progressively endwise into a circumferentially closed tube;

introducing fused second metal into the tube from a position upstream of the tube, said second metal having a melting temperature lower than that of said first metal;

causing the fused second metal to quickly solidify within the tube to form a core therein and concurrently cause the tube to pull radially relative to the core; and

contracting the tube about the solidified core after the temperature of the core drops below a preselected temperature.

4,013,212

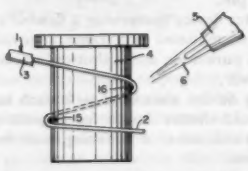
SOLDERING METHOD

Imrich M. Miller, Paterson, N.J., assignor to Universal Manufacturing Corporation, Paterson, N.J.

Filed Jan. 21, 1972, Ser. No. 219,661

Int. Cl.² B23K *1/08*

U.S. Cl. 228—203 **6 Claims**



1. A method for forming an electrical connection between an uninsulated electrical terminal of electrically conductive material and an electrical conductor which has electrical insulation thereover comprising the steps of

bringing a portion of said conductor having insulation thereon adjacent said uninsulated terminal and holding the conductor to the terminal,

applying heat from a flame of a temperature above the melting point of the insulation to a selected area of said conductor adjacent said terminal to remove the insulation from said area while said conductor is held to the terminal in an air environment, and

immersing the terminal with the electrical conductor held thereto in an ultrasonically agitated bath of liquid solder to solder them together with the solder connection being made in at least a portion of the area of the conductor where the insulation was removed.

4,013,213

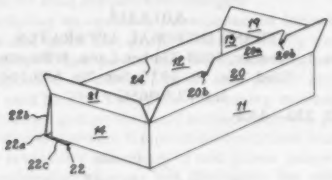
POSTAL TRAY

Buddy E. Giebel, Monroe, Mich., assignor to Union Camp Corporation, Wayne, N.J.

Filed Apr. 12, 1976, Ser. No. 675,741

Int. Cl.² B65D *5/10*

U.S. Cl. 229—39 R **2 Claims**



1. A tray adapted primarily for handling, shipping and sorting mail comprising

opposed side and opposed end panels;

a bottom;

a narrow top closure flap secured to one side panel along a first hinge line; and

a wide top closure flap secured to the opposite side panel along a second hinge line;

said narrow and wide top closure flaps being provided with means to lock the flaps in closed position over the tray;

said wide top closure flap being scored along a longitudinal line substantially parallel to the second hinge line to provide a narrow top closure panel along the outer edge of the said flap and a wide top closure panel between the said longitudinal score line and the second hinge line; and

said wide top closure panel being approximately equal in width to the height of the side panel to which it is secured;

whereby the said wide top closure flap can be reverse folded to substantially superimpose the wide panel of such flap on its adjacent side panel and to position the narrow panel of such flap under the bottom of the tray so that unobstructed access to the top of the tray is provided for easy sorting of the mail in such tray.

4,013,214

PLASTIC DISPLAY CONTAINER HAVING HINGED COVER

Roger P. Hansen, and Larry J. Vis, both of Rockford, Mich., assignors to Display Pack, Inc., Grand Rapids, Mich.

Filed May 17, 1976, Ser. No. 687,384

Int. Cl.² B65D *45/16, 51/04, 5/66*

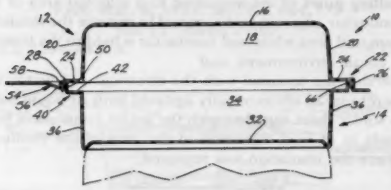
U.S. Cl. 229—44 R **22 Claims**

1. A container moldable from a resilient, semirigid plastic material comprising:

a cover member having a depending peripheral skirt integral with the side walls of said cover;

a base member having an upstanding peripheral skirt integral with the side walls of said base and receivable within the depending skirt of said cover member;

one of said peripheral skirts having an angled slot therein at the juncture of said one of said peripheral skirts with one of said members; and



hinge means extending through said slot and outwardly from the other of said peripheral skirts for permitting opening pivotal movement of said cover member relative to said base member and preventing removal of said cover member from said base member when said cover is pivoted to an open position.

4,013,215

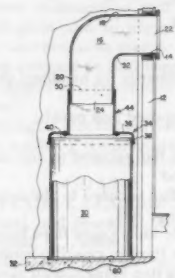
TRASH DISPOSAL APPARATUS

Charles A. Mercier, 1009 Timber Lane, Wilmette, Ill. 60091

Filed Nov. 10, 1975, Ser. No. 630,164

Int. Cl.² B65G *11/14*

U.S. Cl. 232—43.1 **3 Claims**



1. A trash disposal apparatus for conducting small articles from a kitchen area within a residential building through an opening which is formed in the kitchen wall to a discharge area exteriorly of the building in relatively close proximity to the latter and below the level of such opening, said apparatus comprising a substantially cylindrical trash container having an open upper circular rim and disposed in an upright position in said discharge area, a circular disk-like cover for said container and provided with a depending peripheral apron-like flange adapted to encompass said upper rim of the container when the cover is in its operative position of closure on the container, said cover being formed with a central opening therein, a tubular sleeve fixedly secured to the cover and projecting vertically upwardly from said opening, an open-ended trash delivery chute of generally inverted L-shaped configuration and including an upper leg having a horizontal directional component and a vertical leg, a curved elbow-like juncture region establishing communication between said legs, the distal lateral end of said upper leg being adapted for reception within said wall opening and establishing a trash inlet, the lower end of said vertical leg establishing a trash discharge outlet, said sleeve being telescopically and loosely slidable on said vertical leg between a lowered position wherein the cover seats in its operative position of closure on the container, and a fully raised position wherein the upper open rim of the sleeve frictionally engages and binds against said curved elbow-like juncture region, thus maintaining the cover in a raised position vertically spaced from the container to afford access to the interior of the latter, as well as to permit withdrawal of the container from said discharge area for emptying and replacement thereof, the frictional engagement between the upper rim of the sleeve and the curved juncture region constituting the sole supporting means for maintaining the cover in its fully raised position.

4,013,216

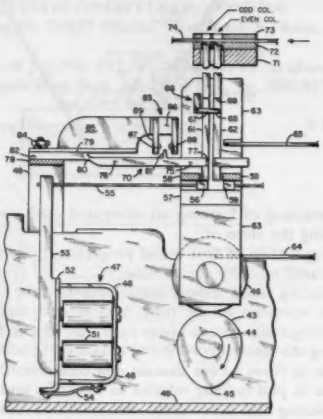
PUNCH CHECK APPARATUS

Jay A. Smith, Lansdale, and James P. Linde, Lafayette Hills, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 584,802

Int. Cl.² G06K *1/02*

U.S. Cl. 234—34 **3 Claims**



1. A punch card subsystem for a card punch comprising:

a register for receiving and storing a plurality of signals indicative of data to be punched into a card,

a plurality of punch pins for punching said data into said card,

a plurality of punch pin selection actuators responsive to said data stored in said register for selecting individual punch pins to be moved,

punch pin driving means for moving said punch pins selected by said punch pin selection actuators,

a shutter device associated with and movable by each said punch pin,

said shutter device comprising a flexible cantilever having a fixed end mounted on a frame, a movable end connected to said punch pin and a shutter intermediate the ends of said lever,

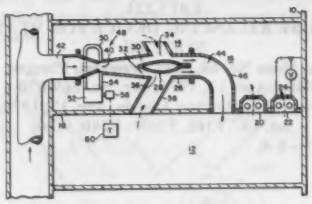
a sensing device associated with each said punch pin and each said shutter device for generating punch pin data signals indicative of punching movement of said punch pins, and

error checking means for comparing said data stored in said register and said punch pin data signals for verifying correct card punch entries.

4,013,217
DOUBLE INDUCTION AIR CONDITIONING WITH FLUIDIC CONTROL

Edward A. Owen, Penn Hills Township, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1975, Ser. No. 627,733
Int. Cl.² F24F 13/04
U.S. Cl. 236—13 4 Claims

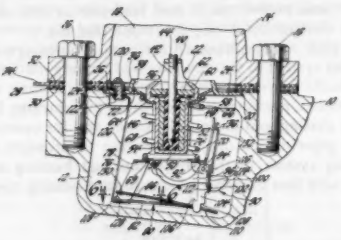


1. A double induction mixing box including means separating said box into two opposite side passages, a damperless opening to each of the two opposite side passages in said box and through which air from the room being conditioned is induced into one opening, and through which air from a ceiling plenum in which said mixing box is installed is induced into the other opening, in proportions to maintain a desired temperature in the room, said box having at its upstream end a narrow inlet opening connected to a primary air source for delivering air into said inlet opening in a correspondingly narrow stream of sufficient capacity and velocity to effect said induction of air at said damperless openings, said separating means having an upstream end spaced downstream from said inlet opening and spaced upstream from said damperless openings, and fluidic diverting means located at said inlet opening where said narrow stream of primary air enters the box for controlling the diversion of primary air between the opposite side passages to correspondingly control the induction of air into the one and the opposite side passages.

4,013,218
SELF-INDICATING THERMOSTAT

Jack B. King, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 29, 1976, Ser. No. 653,355
Int. Cl.² F01P 7/02
U.S. Cl. 236—34.5 5 Claims



3. A combination temperature responsive fluid control valve and overheat indicating assembly which provides a warning indication when an overheat condition is caused by unresponsiveness of the control valve to increased temperature, but does not provide an indication otherwise, comprising:

fluid passage forming means including an apertured frame adapted to be supported so as to intercept fluid flow;

a movable valve member operably cooperating with said passage forming means to prevent fluid flow through said aperture when in a closed operative position and allowing fluid flow therethrough when moved to a more open operative position;

a thermally activated power means operably connected to said valve member for moving said valve from its closed operative position to a more open operative position when fluid temperatures exceed a start-to-open temperature;

said frame supporting a bimetal type overheat warning switch of elongated and substantially flat configuration which is supported at one end to permit movement of the opposite second end portion from a first low temperature operative position to a second higher temperature operative position;

said bimetal switch member having elongated slot means extending therethrough from said first end to an intermediate location, thus separating said first end portion of said switch into side by side arm portions capable of independent movement;

all but one of said arm portions being connected to said frame with said one arm portion unattached and free to move in a substantially normal direction to the plane of the switch member as said opposite second end portion of the switch moves in a similar non-planar direction in response to fluid temperature changes;

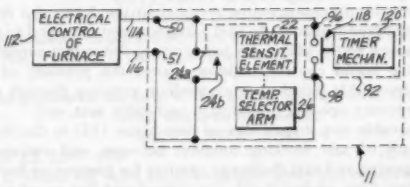
means including an operably interconnected follower arm portion and latch arm portion, both pivotally mounted with respect to said power means and said bimetal switch and responsive to movements of said power means to engage said bimetal switch for preventing movement of its second end portion into said second operative position in response to overheat temperature conditions accompanied by responsive movement of said power means to the fluid temperature changes and alternately, for maintaining the second end portion of said bimetal switch in its second operative position after an overheat condition has occurred accompanied by failure of said power means to respond to the fluid temperature changes;

circuit means including a selectively activated warning indicator and a conductive support member cooperative with said movable one arm of said bimetal switch to activate said warning indicator in correspondence with movements of said bimetal switch into its second operative position, thereby indicating an overheat condition caused by unresponsiveness of said power means to fluid temperature changes.

4,013,219
MANUALLY ACTUATED, SELF-EXPIRING, TEMPORARY OVERRIDE APPARATUS AND METHOD FOR THERMOSTATIC SYSTEM

James W. Jacobson, 17643 NE. 30th Place, Redmond, Wash. 98052

Filed Mar. 15, 1976, Ser. No. 666,666
Int. Cl.² H01H 37/62; F23N 5/20
U.S. Cl. 236—46 R 2 Claims



1. In a thermostatically regulated system of the type having an electrically controlled means that can be turned on and off

to regulate an ambient temperature in a building, and including a thermostat mounted in such building and having a thermosensitive means for operating electrical contacts between open and closed conditions in response to such ambient temperature, means for setting a predetermined ambient temperature at which said contacts are operated by said thermosensitive means, and output terminal means connected to said contacts for alternately assuming first and second electrical states depending upon said conditions of said contacts, said terminal means adapted for connection to said electrically controlled means for turning such electrically controlled means on when said terminal means are in said first electrical state and for turning such electrically controlled means off when said terminal means are in said second electrical state, an improvement in said thermostat, comprising:

manually actuatable self-expiring timer means having a predetermined maximum timing interval; and

electrical override means connected in circuit with said terminal means and responsive to said timer means when actuated to cause said terminal means to assume said first electrical state for the duration of said timing interval, independently of the operation of said electrical contacts by said thermosensitive means, whereby a normal operating mode is provided when said timer means is unactuated during which said electrically controlled means is thermostatically regulated to achieve said predetermined ambient temperature and an override mode is provided in response to manual actuation of said timer means for turning the electrically controlled means on for the duration of the timing interval to produce an unregulated temporary change in the ambient temperature.

4,013,220

BACK-PRESSURE-RESISTANT VAPOR TRAP FOR CONDENSATE DISCHARGE

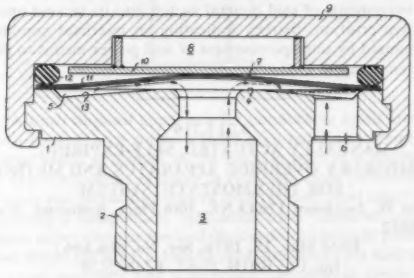
Raimund Zoller, Oberwil, Switzerland, assignor to KERAG Kessel-,Apparate- und Anlagenbau Richterswil/Switzerland, Richterswil, Switzerland

Filed July 7, 1975, Ser. No. 593,289

Claims priority, application Germany, July 9, 1974, 2432964

Int. Cl.² F16T *1/04*

U.S. Cl. 236—56 **4 Claims**



1. A vapor trap for release of condensate comprising:

a valve seat provided around the edge of a discharge opening;

a movable discharge valve member in the form of a first membrane adjacent to said valve seat and arranged to be moved by the effect of a temperature-dependent vaporizable liquid control medium against the pressure of a vaporizable liquid working medium entering through an entrance opening provided in said valve seat, and

a movable ring-shaped second membrane (**11**) in the flow path of said working medium between said entrance opening and said discharge opening for preventing backflow, lying against the closure side of said first membrane (**7**) and peripherally clamped in common with said first membrane,

said valve seat being encircled by an obliquely profiled annular set back further valve seat surface (**13**) which is set back at the deepest part of its setback profile by at least the thickness of said second membrane (**11**), and

the pliability of said second membrane (**11**) being greater than that of said first membrane (**7**) in the region where said membranes are peripherally clamped and being smaller than that of said second membrane (**7**) in the region of said valve seat (**4**).

4,013,221

PRESSURE BALANCING DEVICE FOR HEATING SYSTEMS

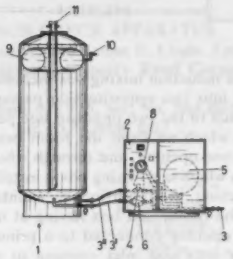
Anton Eder, Haus No. 68, 5733 Brambert, Pinzgau, Austria

Filed Apr. 17, 1975, Ser. No. 569,070

Claims priority, application Austria, Apr. 17, 1974, 3185/74

Int. Cl.² F16L *55/04*; **F24H** *9/20*

U.S. Cl. 237—8 R **5 Claims**



1. A pressure balancing device for use in a heating system employing therein a heating medium, said device comprising:

an expansion tank adapted to be connected to said heating system and having separate feed and drain pipe means connected thereto for respectively feeding said heating medium to said expansion tank from said heating system and draining said heating medium from said expansion tank to said heating system;

said expansion tank having therein first chamber means, fluid isolated from the exterior atmosphere, for storage of said heating medium received from said heating system, said first chamber means being maintained at a pressure lower than that of said heating system;

second chamber means, having an interior in communication with the exterior atmosphere and an exterior exposed to the pressure in said first chamber means, for varying the volume of said first chamber means dependent upon the pressure therein;

valve means, positioned in said feed pipe means, for normally closing said feed pipe means and for opening said feed pipe means upon an increase in pressure in said heating system to thereby pass said heating medium from said heating system to said first chamber means; and

pump means, positioned in said drain pipe means, for normally closing said drain pipe means and for opening said drain pipe means upon a decrease in pressure in said heating system to thereby pump said heating medium from said first chamber means to said heating system.

4,013,222

ROTATING WASHER ASSEMBLY

Dalny Travaglio, Kensington, Calif., assignor to Jack Rogers, Concord, Calif.

Filed Sept. 22, 1975, Ser. No. 615,515

Int. Cl.² B05B *3/06*, *3/16*

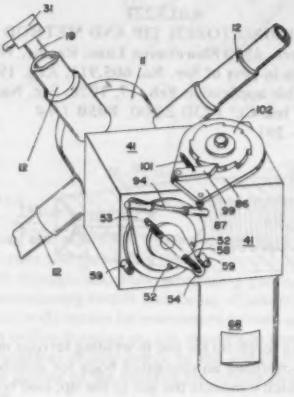
U.S. Cl. 239—98 **14 Claims**

1. A washing device using cleansing liquid under pressure, comprising a spindle means rotatably secured in a housing and having a liquid flow channel therethrough,

nozzle means extending from said spindle means for spraying said liquid,

reaction jet means, extending from said spindle means, for emitting at least one stream of liquid and driving said spindle means in a rotational motion,

valve means for selectively permitting liquid flow to said reaction jet means, said valve means including a valve shaft extending coaxially within said spindle means and freely rotating therein, and a valve member secured on said valve shaft adjacent to said reaction jet means and including flow ports extending therethrough from said liquid flow channel of said spindle means to said reaction jet means,



arbor means rotatably secured within said housing and including a liquid flow passage connecting a source of said liquid under pressure to said liquid flow channel,

switch means for controlling said valve means, said switch means including a toggle arm extending from said valve shaft, a spindle arm extending from said spindle means adjacent to said toggle arm and rotatable about a common axis, first linking means joining said toggle arm and said spindle arm in an over-center toggle fashion, and

second linking means extending between said spindle means and said arbor means for driving said housing in rotational motion about said arbor means.

4,013,223

FUEL INJECTION NOZZLE ARRANGEMENT

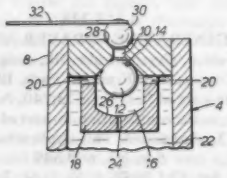
Barrie James Martin, Shenfield, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed July 15, 1975, Ser. No. 596,205

Claims priority, application United Kingdom, July 16, 1974, 31549/74

Int. Cl.² B05B *17/06*

U.S. Cl. 239—102 **7 Claims**



1. A fuel injection nozzle arrangement comprising a fuel injection nozzle having a fuel injecting orifice, and vibratory means for vibrating the nozzle to cause atomization of fuel ejected from the nozzle through the orifice, the nozzle having a fuel-retaining valve at the fuel inlet side of the orifice arranged to normally close the orifice and thus prevent the injection of fuel but to be opened when the vibratory means is energised to permit injection of fuel, and the nozzle having a gas-excluding valve at the fuel outlet side of the orifice arranged to normally close the orifice and thus prevent the entry of gases into the nozzle through the orifice but to open under fuel injection pressure to permit the injection of fuel, and the fuel retaining valve being situated in a housing in the nozzle and the housing having at least one aperture at a position where the valve will tend to move when the vibratory means is activated thereby to allow fuel to enter the housing through this aperture and force the fuel-retaining valve towards the orifice when the nozzle is not being vibrated.

4,013,224

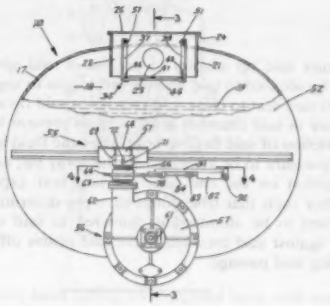
MATERIAL SPREADER

Thomas M. Carter, Wayzata, Minn., assignor to Veda, Inc., Long Lake, Minn.

Filed Sept. 22, 1975, Ser. No. 615,478

Int. Cl.² B05B *9/04*; **A01C** *15/00, 23/00*

U.S. Cl. 239—148 **34 Claims**



1. An apparatus for spreading material, as liquid manure, onto a location comprising: a tank having a top wall and a chamber for holding material, wheel means for supporting the tank whereby the tank can be moved over the ground, an upright tubular wall secured to the top wall of the tank, said tubular wall having a portion extended down from the top wall into the chamber and a passage open at one end to the chamber and open at the other end outside of the tank whereby material can be placed in the chamber through said passage, said portion having a lower edge located below the top wall, open grid means secured to the tubular member and extended across said passage in general alignment with the lower edge of the portion of the tubular wall operable to prevent large objects from being placed in the chamber, fastening means for connecting the open grid means to the tubular wall, and means for removing material from the chamber and spreading the material onto a location.

4,013,225

EXTENSION SPRAY GUN

J. C. Davis, 9818 Hathaway, Dallas, Tex. 75220

Continuation-in-part of Ser. No. 464,992, April 29, 1974, Pat. No. 3,915,382. This application Aug. 25, 1975, Ser. No. 607,717

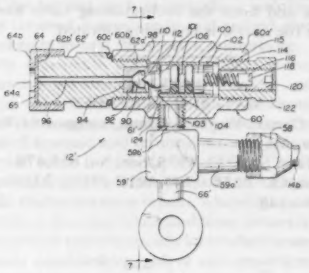
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.

Int. Cl.² B05B *15/00*

U.S. Cl. 239—195 **10 Claims**

1. A shut off valve on an extension spray gun comprising: a plurality of hollow pole sections, each of said pole sections having a bore extending therethrough; means telescopically securing each said pole section to another pole section; a

flexible hose extending through the bore in said hollow pole sections; spray valve means; means to secure said spray valve means to one of said pole sections; a spray nozzle having a chamber formed therein, means to secure said spray nozzle to the outer end of another pole section; means to secure a first end of said hose to said spray valve means; means to secure a second end of said hose to said chamber in said spray nozzle; means to deliver pressurized fluid to said spray valve; a piston slideably disposed longitudinally in said chamber; a tip adapter having a passage defined longitudinally therethrough and a seat positioned to receive one end of said piston; means

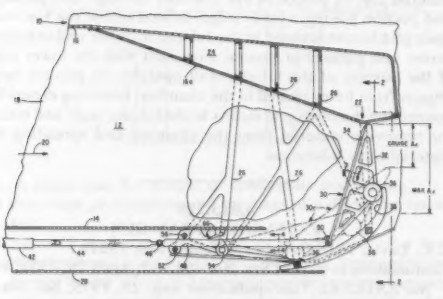


to secure said tip adapter to an end of said spray nozzle; a spray tip secured to said tip adapter; means to urge said piston against said seat to close said passage in said tip adapter when pressure in said chamber is reduced to prevent leakage upon constriction of said flexible hose when the fluid is not of sufficient pressure to be atomized by the spray tip; and an area of said piston on the end adjacent said seat exposed to said chamber such that when fluid of a pre-determined pressure sufficient to be atomized is delivered to said chamber, the force against said area will move said piston off of said seat, opening said passage.

4,013,226
VARIABLE JET NOZZLE WITH BALANCED TWO-DIMENSIONAL BLOCKER FLAP

Charles M. Willard, Creve Coeur, Mo., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 14, 1976, Ser. No. 676,952
Int. Cl.² B64C *15/06*
U.S. Cl. 239—265.29 **9 Claims**



1. A variable, jet nozzle throttling apparatus in combination with the airframe of a V/STOL jet aircraft including a duct that is defined in part by parallel first and second walls and by converging third and fourth walls to define a jet nozzle zone, said apparatus comprising:

a blocker-flap comprising a generally triangular truss-work having a base side and an apex opposite said base side, wheel means mounted at said apex for rollingly and pivotally supporting said blocker flap, and a flap plate mounted on said base side and presenting a substantially two-dimensional blocking surface;

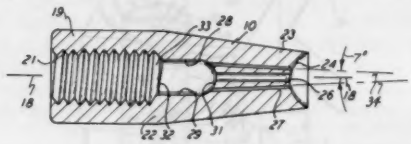
curved track means, mounted on said airframe at opposite sides of said duct, for cooperation with said wheels; and

linear actuator means, mounted on said airframe adjacent said third wall and coupled to one end of said blocker-flap, for moving said blocker-flap in translation and tilt along said track means between open positions wherein said blocking surface defines a nozzle zone wall and a closed position wherein said blocking surface obturates said duct.

4,013,227
WELDING TORCH TIP AND METHOD

John T. Herrera, 4510 Shorehaven Lane, Racine, Wis. 53403

Continuation-in-part of Ser. No. 605,911, Aug. 19, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,177
Int. Cl.² F23D *23/00;* **B05B** *1/14*
U.S. Cl. 239—291 **2 Claims**



1. A welding torch tip for use in welding ferrous metals with Mapp gas, comprising an elongated body for attachment to a supply line which conducts the gas to the tip, said body having a gas-flow passageway extending through one end thereof and having an outlet end and extending along the longitudinal axis of said one end for the flow of the gas from the tip, said body having a chamber disposed in gas-flow communication with said passageway and being located on said longitudinal axis and of a cross-sectional size greater than the cross-sectional size of said passageway, for guiding the gas to flow through said body, said chamber being shaped to present an end wall of a concave shape extending transversely to the longitudinal axis of said passageway and with the center of the concave shape intersecting said passageway for mixing of the gases flowing through said body, said body having a concave end surface intersecting the gas outlet end of said passageway for directing the gases along the longitudinal axis of said one end, said body having a plurality of additional gas-flow passageways extending therein adjacent and spaced around the first said passageway and being in gas-flow communication with said chamber from said end wall for the flow of the gases from the tip, said additional gas-flow passageways aligned to intersect said concave end surface at locations spaced from the first said passageway at said end surface and having the longitudinal axes of said additional gas-flow passageways being angled inwardly and toward the longitudinal axis of the first said passageway.

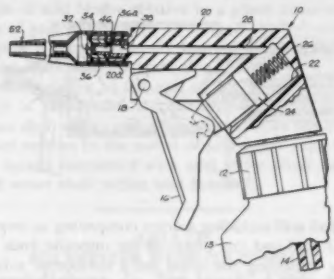
4,013,228
FOAM GENERATING SPRAYER APPARATUS

Barry L. Schneider, Crystal Lake, Ill., assignor to Chemtrust Industries Corporation, Franklin Park, Ill.

Continuation-in-part of Ser. No. 523,740, Nov. 14, 1974, Pat. No. 3,946,947, and a continuation-in-part of Ser. No. 396,183, Sept. 11, 1973, abandoned. This application Mar. 23, 1976, Ser. No. 669,649
Int. Cl.² B05B *1/30, 1/34, 7/04*
U.S. Cl. 239—401 **10 Claims**

1. An adjustable foam generating sprayer comprising, in combination: sprayer body means defining an inlet section through which liquid can pass, said inlet section including outlet orifice-forming means through which liquid passes for

providing a diverging stream flowing therefrom; and a foam-producing nozzle unit having a foam-producing section adjacent to and downstream from said outlet orifice-forming means which foam-producing section has an inlet end which receives the entire variably shaped stream issuing from said outlet orifice-forming means, air inlet portforming means in communication with the exterior of the sprayer, and foam-producing passageway means communicating with said air inlet port-forming means and said inlet end of the nozzle unit



for effecting the aspiration of air through said air inlet port-forming means and the mixing thereof into the liquid stream as the stream through said foam-producing passageway means, said foam-producing nozzle unit being adjustably mounted on said sprayer body means for movement toward and away from said outlet orifice-forming means, thereby to vary the portions of the passageway means struck by the stream, which, in turn adjusts the quality of the foam of the stream flowing from the nozzle unit.

4,013,229

INJECTION NOZZLE FOR LIQUIDS, PARTICULARLY FOR FUELS

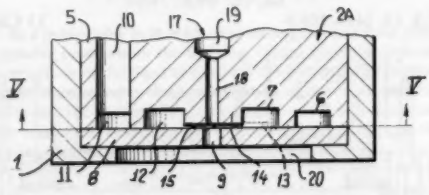
Ulrich Rohs, Roonstrasse 11, D 516 Duren, Germany

Filed Feb. 19, 1975, Ser. No. 551,132

Claims priority, application Germany, Feb. 19, 1974, 2407856

Int. Cl.² B05B *1/34*

U.S. Cl. 239—493 **9 Claims**



1. An injection nozzle for liquids, said injection nozzle comprising a nozzle body having a discharge end, a cover plate opposing said nozzle body discharge end, said discharge end being configurated to define a central core having an end surface, said cover plate having an exhaust orifice therethrough in alignment with said core, said core end surface being of a greater size than said exhaust orifice and completely overlying said exhaust orifice, an annular recess in said nozzle body surrounding said core and together with said cover plate defining a spinning chamber, an inlet channel disposed outwardly of said spinning chamber, said inlet channel being defined by a recess in said nozzle body with said recess being closed by said cover plate, and spin channels extending from said inlet channel substantially tangentially into said spinning chamber immediately above said cover plate, said cover plate being permanently spaced from said core end surface and defining between said cover plate and said core end surface a narrow gap through which liquid being injected passes from said spinning chamber into said exhaust orifice, said spin channels discharging into said spinning chamber substantially at the level of said gap, and said gap having a flow section at the periphery of said core materially less than the cross section of said exhaust orifice.

4,013,230

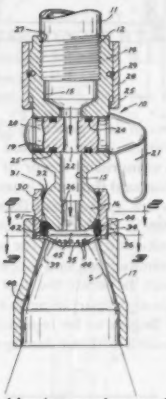
SHOWER HEAD

John T. Gondek, 1641 W. Innsbruck Circle, Minneapolis, Minn. 55421

Filed Nov. 10, 1975, Ser. No. 630,188

Int. Cl.² B05B *1/26*

U.S. Cl. 239—499 **8 Claims**



1. In a shower head having an elongated body with one end adapted to be threaded onto the end of a water supply pipe and having a passage extending longitudinally therethrough, an annular skirt mounted on the other end of the body and positioned coaxially with said passage and extending axially a distance substantially beyond said other end of the body, a perforate plate member disposed between said other end of the body and the extended end of the skirt to restrict the flow of water from such passage through said skirt, said plate member having an annular series of apertures disposed about the axis of the skirt to divide the flow of water into a plurality of diverging jet sprays, the apertures and skirt being so formed as to direct said sprays into engagement with the edge portion of the extended edge of the skirt, and the entire inner side of the extended edge of said skirt having a smooth continuous surface.

4,013,231

AEROSOL CAN NOZZLE AND CAP ASSEMBLY

George E. Van Veldhoven, 13934 Yukon Ave., Hawthorne, Calif. 90250

Filed Oct. 17, 1974, Ser. No. 515,565

Int. Cl.² B65D *83/14*

U.S. Cl. 239—579 **2 Claims**

1. A readily cleanable nozzle and cap member for use on aerosol cans, said member comprising:

a cylindrical skirt adapted to fit over the spray end portion of an aerosol can;

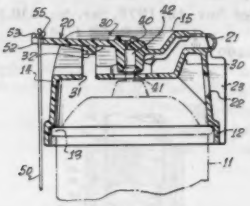
a side wall affixed to said skirt and extending upwardly therefrom, said side wall curving inwardly to form a top wall;

hinge means connected to said side wall comprising a loop of flexible plastic;

a nozzle assembly supported by said hinge means and posi-

tioned to permit said nozzle assembly to swing at least 90° from its closed position to permit the nozzle to be positioned in an open position which is away from the outer surface of the rest of the cap and further positioned to cause at least a portion of said nozzle assembly to protrude below the top of said cylindrical wall when said hinge is in a closed position and to cause the lower extremity of said nozzle assembly to abut valve means on the spray end of an aerosol can; a flattened extension located on the opposite end of said nozzle assembly from the hinge means end thereof

disconnectable latching means interconnecting said side wall and said nozzle assembly to cause said nozzle assembly hinge to remain in a generally closed position when said latching means is in a closed configuration, said latching means comprising a pair of flexible aligned fingers positioned on said flattened extension at a right angle with respect to the axis of said flattened extension and said top wall has at least one opening having a pair of upper stops positioned so that the spacing between the uppermost termination of said stops are closer together than the distance between the tips of said fingers but positioned far enough apart to permit the nozzle assembly and its aligned fingers to be repeatedly pulled upwardly out of said side wall without damage to said aligned fingers.



4,013,232

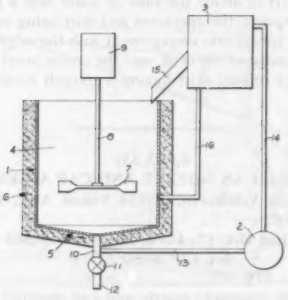
DISPERSION OF PIGMENTS BY CRYOGENIC ATTRITION

Lewis Broughton, Stockport, England, assignor to National Research Development Corporation, London, England

Filed Jan. 6, 1976, Ser. No. 646,749

Int. Cl.² B02C *23/06*

U.S. Cl. 241—3 **8 Claims**



1. A method of forming a dispersion of an organic pigment in water consisting of the steps:

first, forming a water-containing filter cake and reducing it to a fluid mass,

second, adding a surface-active stabilizing agent to the fluid mass,

third, causing a portion of the water present to freeze for forming ice particles,

fourth, agitating the pigment-water-stabilizing agent-ice mixture.

4,013,233

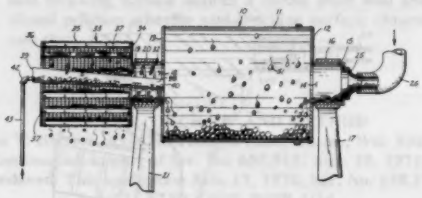
BALL MILL

Kenneth G. Nylund, Rte. 1, Box 40C, Globe, Ariz. 85501

Filed July 29, 1976, Ser. No. 709,591

Int. Cl.² B02C *23/12*

U.S. Cl. 241—80 **5 Claims**



1. In a ball mill including a drum comprising an imperforate cylindrical wall and end plates at the opposite ends thereof, means for mounting the drum on a horizontal axis, power means for rotating the drum, an entry opening formed in one of said end plates, means for introducing ore aggregate into said drum through said entry opening, a discharge opening in the other of said end plates, a throat at said discharge opening, and a trommel screen mounted on said throat and having an open end remote from said throat; the improvement consisting of: mechanism for returning materials from said trommel screen through said throat to said drum, and comprising:

a. pick up elements on the inner surface of said trommel screen for picking up materials therein as an incident to rotation of said trommel screen,

b. a trough extending through said trommel screen, said throat, and to said drum and positioned to receive materials falling from said pick up elements as the latter reaches an upper position as an incident to rotation of said screen; and,

c. pressure fluid means for forcing the materials in said trough therealong and into said drum.

4,013,234

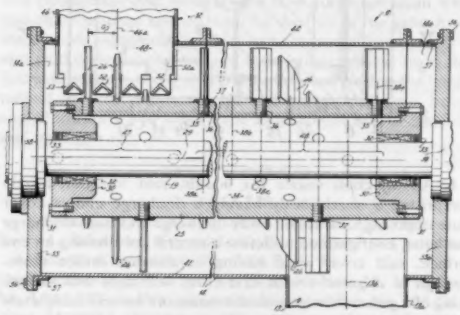
DOUGH MIXER

Rudolph J. Fay, Cincinnati, Ohio, assignor to J. W. Fay & Son, Inc., Cincinnati, Ohio

Filed Nov. 5, 1975, Ser. No. 628,896

Int. Cl.² B02C *19/00*

U.S. Cl. 241—101.6 **13 Claims**



1. A mixer for admixing a food dough comprising

a mixer housing

a plurality of blades fixed to a single mixer shaft disposed within said mixer housing, said blades all being of the same geometry,

an inlet hopper having a grillwork floor disposed adjacent the exterior periphery of said single mixer shaft, a portion

of said blades projecting up and through said grillwork floor during rotation of said mixer shaft, said blades and grillwork floor cooperating to cut thoroughly any recycled dough scrap upon introduction of same into said mixer, the blades that cooperate with said grillwork floor being in the chopper section of said mixer and the blades that do not cooperate with said grillwork floor being in the mixer section of said mixer,

mounting means connecting said blades to said single mixer shaft, said mounting means being operable to adjust the pitch of said blades relative to a plane transverse to the axis of said mixer shaft, said blades within said chopper section lying substantially transverse to the axis of said mixer shaft, said blades within said mixer section being pitched relative to the axis of said mixer shaft, and the pitch of said blades increasing along the length of said mixer shaft within said mixer section from the inlet of said mixer section to the outlet of said mixer section, and

drive means connected with said mixer shaft for rotating said mixer shaft within said housing.

4,013,235

PULVERIZER HYDRAULIC DRIVE

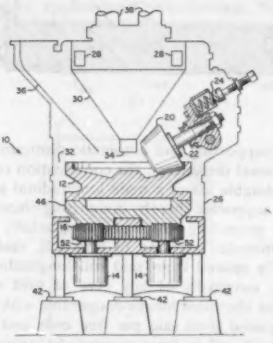
John Joseph Halloran, Jr., East Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 19, 1976, Ser. No. 687,960

Claims priority, application Japan, July 29, 1975, 50-104116

Int. Cl.² B02C *15/00*

U.S. Cl. 241—117 **3 Claims**



1. In a pulverizing mill, a housing having a lower base plate, a rotatable bowl within the housing, means coacting with the upper surface of the bowl to perform the pulverizing function, a ring gear attached to the lower portion of the bowl, a plurality of hydraulic motors secured to the lower base plate, each motor having an associated drive gear which coacts with the ring gear of the bowl to cause rotation thereof.

4,013,236

AUTOMATIC DISMOUNTING ROLL FOR ROLL TOWEL DISPENSERS

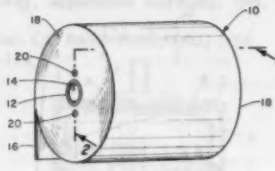
Jack Louis Perrin, Los Angeles, Calif., assignor to Towlsaver, Inc., Los Angeles, Calif.

Filed Mar. 11, 1976, Ser. No. 665,896

Int. Cl.² A47K *10/16, 10/22, 10/32*

U.S. Cl. 242—1 **17 Claims**

6. In a roll of toweling adapted for automatic dismounting from roll end holders of a dispenser; the combination of: a strip of toweling continuously wound about a central core forming said roll, said core forming a roll central longitudinal axis; radially extending end surfaces on said roll; diametrically opposite and axially extending pin holes formed in one of said roll end surfaces having radially inner extremities radially outwardly of said roll core and equally radially spaced from said roll central longitudinal axis; end holder engagement means formed at the other of said roll end surfaces adapted for engagement by a roll end holder until said roll strip of toweling



has been unwound to said radially inner extremities of said pin holes and said roll is being released at said one roll end surface.

4,013,237

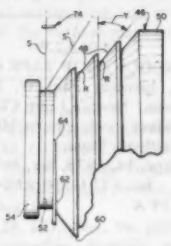
WINDING APPARATUS WITH TAILING DEVICE

Thomas William Perrino, Johnston, R.I., assignor to Leesona Corporation, Warwick, R.I.

Filed Oct. 6, 1975, Ser. No. 620,213

Int. Cl.² B65H *54/00, 54/34*

U.S. Cl. 242—18 PW **14 Claims**



1. Apparatus for winding an advancing strand into a package comprising, strand take-up means mounted for rotation, strand traversing means for guiding said strand to said take-up means to wind the strand into a package thereon, drive means for contacting the surface of said take-up means and sequentially the surface of the package thereon to rotate said take-up means and said package, conical tailing means mounted on said take-up means for rotating therewith, said tailing means having a spiral groove formed therein, said groove being engageable with said strand to wind the strand into a strand tailing end of predetermined length on a predetermined section of said take-up means, the linear length of said groove being essentially equal to said predetermined length.

4,013,238

DEVICE FOR CONTROLLING THE BALLOON AND TENSION IN THE THREAD FROM A THREAD STORING AND DISTRIBUTING APPARATUS TO AN OPERATING MACHINE

Sergio Calamani, Via Settima 27, Segrate San Felice (Milan); Eugenio Turri, Via Benedetto Marcello 1, and Ermanno Savio, Via Garofalo 29, both of Milan, all of Italy

Filed Oct. 20, 1975, Ser. No. 624,162

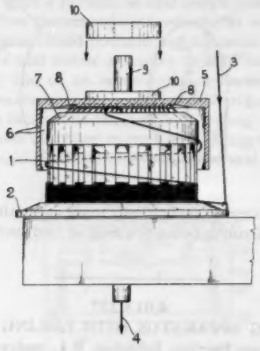
Claims priority, application Italy, Oct. 21, 1974, 28631/74

Int. Cl.² B65H *51/02*

U.S. Cl. 242—47.01 **5 Claims**

1. A device for controlling the balloon of the tension in a thread from a thread storing and distributing apparatus to an operating machine, said device comprising: a bell having a base wall; a substantially cylindrical peripheral wall extending from said base wall; said bell having an inner diameter larger

than the outer diameter of storing apparatus to which the device is applicable; means for supporting and spacing said base wall on the top of a yarn storing apparatus; said means comprising a plurality of thin flexible elongated fingers having



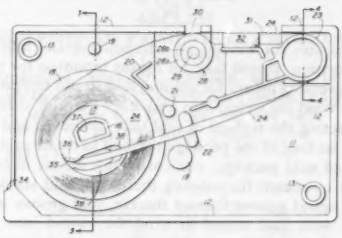
one free end, said flexible fingers being inclined to the yarn movement direction during the unwinding step of the storing apparatus and being distributed according to a circular crown or sector, said bell being supported directly and safely by said fingers.

4,013,239

CONTINUOUS LOOP TAPE CASSETTE

Paul R. Beswick, Ipswich; Paul W. Berton, Marblehead; Charles F. Ganem, Newton, and Clark E. Johnson, Jr., Weston, all of Mass., assignors to Micro Communications Corporation, Waltham, Mass.

Filed Apr. 14, 1975, Ser. No. 567,605
Int. Cl.² G11B *23/04*
U.S. Cl. 242—55.19 A **9 Claims**



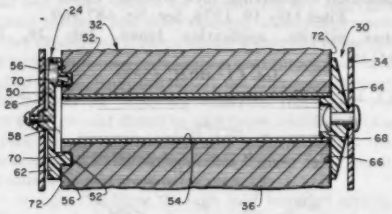
1. A continuous loop tape cassette, comprising:
a housing having
A. a planar base means;
B. a continuous wall affixed to the periphery of said base;
C. a cover adapted to couple to said base;
D. said wall having a flat, vertical reference surface with an opening therein to adapt said cassette to receive a tape drive and expose the tape along its axis for coupling said tape to an external device;
E. said base means having a post means for engaging a flanged, generally circular, hub means;
F. a stationary, generally circular, hub means having a flange for carrying a tape coil thereon, said hub means having a bore therethrough complementary to and fitted over said post means in fixed radial angular relation to said base means, said hub having means to avoid binding of said tape coil comprising a slot for guiding the inner convolution of the tape coil away from the coil toward the center of the coil, the leading end of the slot having an arc portion curving away from the coil and toward said bore, and the trailing end of the slot being inclined toward the arc portion from the top of the hub to the flange; said arc portion being undercut therearound to facilitate containment of said tape between said hub and said flange;
G. a tape guide post near said wall opening, the base at the bottom of the post being raised to form a step above the upper surface of said flange; and
H. a tape coil carried by said hub means, the tape being uncoiled from the inside of the coil through said slot and passing around said arc portion and thence over said inclined portion to said tape guide post, and thence over said step and around the tape guide post to the outer convolution of said coil.

4,013,240

ROLL SUPPORTING AND AUTOMATIC DISMOUNTING MECHANISM FOR ROLL TOWEL DISPENSERS AND METHOD OF USING

Jack Louis Perrin, Los Angeles, Calif., assignor to Towlsaver, Inc., Los Angeles, Calif.

Filed Mar. 11, 1976, Ser. No. 665,895
Int. Cl.² A47K *10/32, 10/22, 10/16*
U.S. Cl. 242—55.53 **31 Claims**



1. In a roll supporting and automatic dismounting mechanism for roll towel dispensers; the combination of: a first roll end holder rotatable about a main longitudinal axis of a roll adapted to be supported thereby comprising circumferentially spaced axially projecting pins terminating axially in free ends towards the intended location of said roll, said pins being equally radially spaced from said roll longitudinal axis and being radially outwardly of any core of said roll, radially aligned roll end abutment means cooperable with each of said pins axially spaced from said pin free ends and effective to axially abut said roll at least tangentially adjacent radially inner extremities of said pins, axially outward recess means formed in said first holder extending axially outward of said abutment means, said recess means extending radially between said pin radially inner extremities and radially outwardly at least to a closed imaginary circumferential line circumscribed about said roll axis at said pin radially inner extremities; a second roll end holder comprising roll end support means adopted for generally axially releasably supporting an opposite end of said roll, said second holder support means being formed for releasing said roll opposite end upon dispensing of toweling of said roll progressively radially inwardly to said first holder pin radially inner extremities with said first holder recess means permitting said roll to pivot generally radially about said second roll holder and through said first holder recess means.

4,013,241

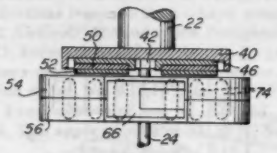
MAGNETIC BRAKING AND CLUTCH SYSTEM

Robert C. Gray, 280 Clifford St., Blackfoot, Idaho 83221

Filed Mar. 6, 1975, Ser. No. 556,083
Int. Cl.² A01K *89/02*
U.S. Cl. 242—84.52 B **9 Claims**

9. A method for braking a rotatable spool fixed to a keyed shaft comprising moving a brake lined magnetic braking disk

carried on said keyed shaft towards and against a stationary member by positioning a plurality of radially moveable mag-



nets housed within said stationary member such that the resulting magnetic lines of flux will move said brake lined magnetic braking disk toward and against said stationary member.

4,013,242

COP TUBE HOLDER FOR WINDING YARNS OR THREADS ON TEXTILE MACHINES

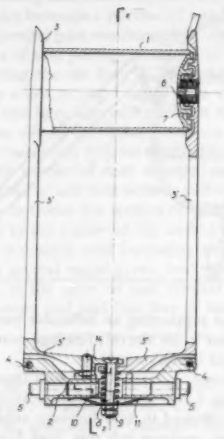
Frantisek Burysek, Usti nad Orlici; Karel Mikulecky, Chocen, and Zdenek Havranek, Usti nad Orlici, all of Czechoslovakia, assignors to Vyzkumny ustav Bavlnarsky, Usti nad Orlici, Czechoslovakia

Filed Nov. 18, 1974, Ser. No. 524,534

Claims priority, application Czechoslovakia, Nov. 19, 1973, 7932/73

Int. Cl.² B65H *49/00*

U.S. Cl. 242—129.51 **2 Claims**



1. For use in a textile machine, an apparatus for removably supporting an elongated cop tube for winding filaments, which comprises, in combination, a base, member, first and second substantially right-angled levers each having first and second arms, means for pivotally supporting the apexes of the first and second levers in opposed, confronting relation on opposite ends of the base member with the first arms of the respective lever extending substantially horizontally toward each other, rotatable cop tube mounting means carried in opposed relation on the outer ends of the respective second arms of the levers for supporting opposite ends of the cop tube, and means kinematically coupling the outer ends of the first arms of the levers and responsive to the movement of the second arm of one of the levers for imparting an equal and opposite movement to the second arm of the other of the levers.

4,013,243

MAGAZINE APPARATUS FOR RUN OFF SPOOLS

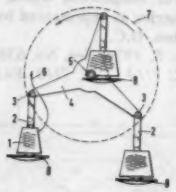
Ingo Mayer, Petersweg 8, Obertshausen, Germany (6053)

Filed Oct. 17, 1975, Ser. No. 623,276

Claims priority, application Germany, Oct. 18, 1974, 348826

Int. Cl.² B65H *49/02*; D03J *5/08*

U.S. Cl. 242—130 **5 Claims**



1. An improved magazine apparatus for presenting run off spools to a rewinding machine comprising:

a drive means;

a rotating means adapted to rotate in a vertical plane and driven by said drive means;

at least two arm means pivotally connected to said rotating means and adapted to hang freely and downwardly therefrom during rotation of said rotating means; and,

at least two spool holding means connected respectively to said arm means for maintaining said run off spools in a plane horizontal to the vertical plane of rotation of said rotating means.

4,013,244

DEVICE FOR CONTROLLING THE POWER OF AN OPTICAL GUIDANCE BEAM

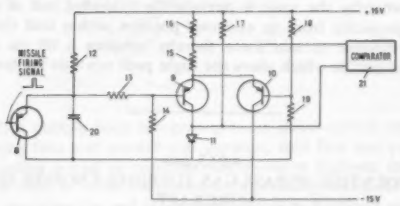
Rolf Helge Biom; Sten Harald Ragnar Forshufvud, and Lars-Erik Skagerlund, all of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Aug. 28, 1975, Ser. No. 608,819

Claims priority, application Sweden, Aug. 28, 1974, 7410865

Int. Cl.² F42B *15/02*; F41G *9/00*, *15/10*

U.S. Cl. 244—3.13 **3 Claims**



1. Laser beam transmitting apparatus for controlling the output power of a laser diode the beam of which is directed in a selected direction so as to guide a missile or the like along the beam an toward a target, said transmitting apparatus comprising:

first circuit means for supplying a variable amount of power to said diode,

second circuit means responsive to the radiation emitted by said diode for generating a first signal representative of the magnitude of said radiation,

control circuit means initiated into operation by the firing of the missile for generating a second signal representative of the desired increase of the magnitude of radiation emitted by said diode during the travel time of the missile toward the target,

third circuit means for generating a signal proportional to the difference between said first and second signals for

controlling the amount of power supplied by said first circuit means to said diode.

4,013,245

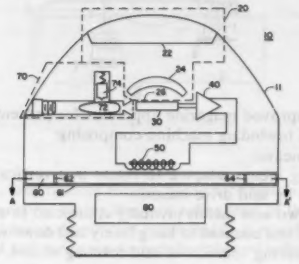
HOMING PROJECTILE

Lyman F. Vanbuskirk, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 5, 1975, Ser. No. 638,138

Int. Cl.² F41G 7/14, 7/00, 7/18; F42B 13/32

U.S. Cl. 244—3.16 **6 Claims**



1. A guidance system mounted in a spin-stabilized autorotative projectile for directing said projectile along a flight path towards a target comprising;

target detection means fixedly mounted in said projectile for providing an output signal representative of a deviation of the projectile flight path from the target;

drive means mounted in said guidance system and effectively coupled to said detection means output so as to receive said deviation signal for providing a force in response thereto having a frequency representative of the period of rotation of the projectile and an amplitude representative of the deviation path from the target;

a tuned frequency vane extensibly mounted in a slot extending through said projectile, said slot and vane being positioned transverse to said flight path, and coupled to said receiving and providing means and responsive thereto whereby the vane is periodically extended out of said projectile from an enclosed position within said slot in response to said force thereby creating a lift on said projectile which alters the flight path towards the target.

4,013,246

MOUNTING BYPASS GAS TURBINES ENGINES ON AIRCRAFT

Douglas John Nightingale, Bristol, England, assignor to Rolls-Royce (1971) Limited, Great Britain

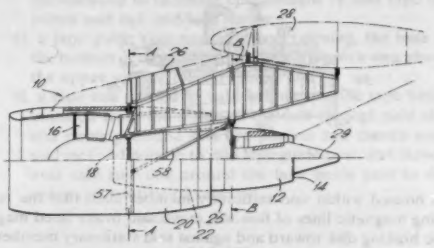
Filed Dec. 12, 1975, Ser. No. 640,158

Claims priority, application United Kingdom, Dec. 24, 1974, 55768/74

Int. Cl.² B64D 27/16

U.S. Cl. 244—54 **6 Claims**

1. An aircraft including structure for externally mounting an engine, a by-pass gas turbine engine having a longitudinal axis and which comprises an engine outer cowling and a core gas generator having an outer casing which is spaced from the engine outer cowling to define a by-pass passage, front and rear core mounting means for supporting the core gas generator from said structure and including connections on the core gas generator and on the structure which connections lie in two planes transverse to and spaced along the engine axis, and first and second cowling mounting means for supporting the engine outer cowling from the fixed structure independently of the core gas generator, said cowling mounting means including connections on the engine outer cowling and on the



structure, which connections lie in the same two planes as the core engine mounting connections.

4,013,247

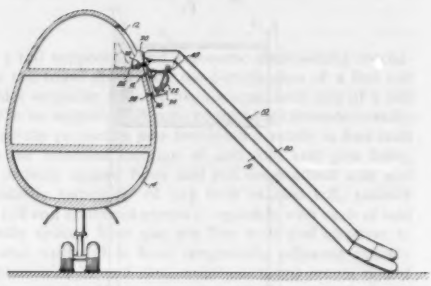
MECHANICAL SUPPORT APPARATUS FOR THE STABILIZATION OF AN INFLATABLE ESCAPE SLIDE

Leverett William Giffin, Kirkland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 30, 1975, Ser. No. 645,390

Int. Cl.² B64D 25/14

U.S. Cl. 244—137 P **15 Claims**



1. Apparatus for supporting an inflatable escape slide adjacent an egress door in an aircraft fuselage comprising:

at least one rigid frame member;

deployment means associated with said frame member for mounting said frame member for movement between a first position stowed in said fuselage adjacent said door and a second position wherein said frame member is positioned outside said fuselage and is oriented so that one end of said frame member is located adjacent said egress door and the opposite end of said frame member is located downwardly from said first end and adjacent said fuselage;

means for mounting said frame member and said deployment means on the interior of said fuselage adjacent said egress door;

latch means associated with said frame member for rigidly securing said frame member to the exterior surface of said fuselage when said frame member is in said second position; and

means for interconnecting said frame member to an inflatable escape slide to positionally stabilize said escape slide relative to said aircraft egress door during and after inflation of said escape slide.

4,013,248

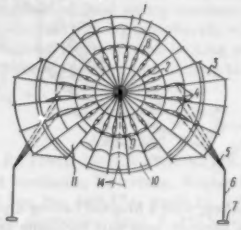
PARACHUTE EQUIPMENT

Ljudmila Nikolaenva Kalabukhova, Kutuzovsky prospekt, 45, kv. 52; Svetlana Ivanovna Rudevskaya, prospekt mira, 184, kv. 192; Alexandr Alexandrovich Petrighenko, Amurskaya ulitsa, 21, korpus 2, kv. 2, and Alberta Sergeevna Smurova, Amurskaya ulitsa 19, kv. 23, all of Moscow, U.S.S.R.

Continuation of Ser. No. 432,157, Jan. 10, 1974, abandoned, which is a continuation of Ser. No. 320,681, Jan. 2, 1973, abandoned. This application May 30, 1975, Ser. No. 582,188

Int. Cl.² B64D *17/18*

U.S. Cl. 244—145 2 Claims



1. A parachute provided with a canopy defined by radial gores joined together by radial seams, comprising a central shroud line; a system of radial vents in a central section of said canopy extending down to a fold line in the canopy and along a radial seam to reduce dynamic loads at the moment of deployment; stabilizing gores adjacent the periphery of said canopy at diametrically opposite sides; controlled valves disposed radially in canopy-sectors bounded by said stabilizing gores and reaching said fold line, each controlled valve being defined by a slot between a portion of a radial seam and a free hem of an adjoining gore overlapping it, the length of the slot exceeding that of said portion of the radial seam; first nozzles radially directing the air flow to the center of the canopy, constituted by a slot across a radial gore with two free hems, the length of one hem exceeding that of the other hem, and arranged at one side of the canopy between the sectors of said stabilizing gores; second nozzles adapted to direct the air flow radially off the center of said canopy, said second nozzles being constructed as said first nozzles and on the opposite side of said canopy between the sectors of said stabilizing gores; a group of vents in the sector of the second nozzles of the canopy including a central vent extending along the hem of the canopy across several radial gores, and lateral vents disposed symmetrically at the sides of said central vent between the hem of the canopy and said fold line of the canopy.

4,013,249

AUXILIARY MOTOR MOUNTING ASSEMBLY

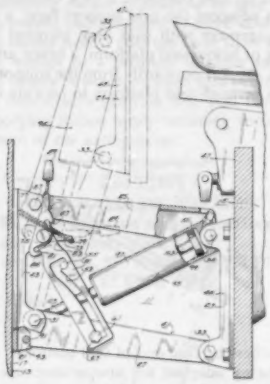
Martin H. Meyer, Waukegan, Ill., and Robert Zakrzewski, Franklin, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Dec. 3, 1975, Ser. No. 637,108

Int. Cl.² B63H *21/26*

U.S. Cl. 248—4 29 Claims

1. A mounting device for a marine propulsion device comprising a first bracket adapted to be attached to a boat and having upper and lower parts, a second bracket adapted to support a marine propulsion device and having upper and lower parts, an upper link pivotally connected at its ends to said upper parts of said first and second brackets, a lower link pivotally connected at its ends to said lower parts of said first and second brackets, whereby to permit swinging of said second bracket relative to said first bracket between first and second positions, and means for selectively holding said second bracket in said first and second positions including a latching arm pivotally carried by one of said brackets and said links for movement so as to selectively prevent movement of said second bracket from either one of said first and second positions in the direction toward the other of said first and



second positions, and means for selectively and yieldably biasing said latching arm so as to selectively hold said second bracket in either of the raised and lowered positions.

4,013,250

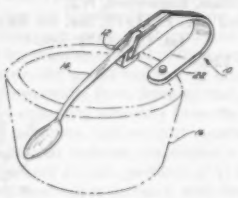
DETACHABLE CUTLERY HOOK

Andrew W. McGaffin, 282 Western Hut Road, Belmont, Lower Hut, Wellington, New Zealand

Filed Jan. 12, 1976, Ser. No. 648,021

Int. Cl.² A47G *21/14*

U.S. Cl. 248—37.3 8 Claims



1. A cutlery hook comprising a one piece curved member having first and second end portions, said first end portion including a pair of resilient wall elements inclined towards each other to define therebetween a generally triangular space for receiving the end of a cutlery utensil in frictional engagement between said walls; an insert element, and cooperating means on said insert element and said first end portion of said one piece curved member for removably securing said insert element on said first end portion between said inclined walls to urge said utensil into tight frictional engagement with said walls.

4,013,251

PAINT CAN HOLDER

John P. Cleveland, 7074 Dover Way, Arvada, Colo. 80004

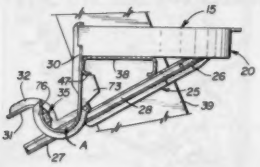
Filed Nov. 24, 1975, Ser. No. 634,677

Int. Cl.² E06C *7/14*

U.S. Cl. 248—210 13 Claims

1. A holder for selective use with liter, quart and gallon size paint cans and the like to hold said cans in level position adjacent elevated user work stations comprising a platform support having an inwardly disposed support face, an inner

base edge disposed on said platform and inclusive of means for selectively receive and support the lower rim of liter or quart size cans with the top limit of said inner base edge being positioned to provide support for the bottom of gallon size cans disposed on said platform, a lock element on said platform support adjacent the said support face, a hook component for engagement with said lock element to selectively extend above or below said platform, a brace arm attached to said platform support outwardly from the support face thereof for extension beneath said platform to provide outrigger support for an otherwise free end of said platform, said hook and brace arm being adapted for cooperative use to hold said platform and any cans disposed thereon at elevated positions for convenient use with said holder when configured for use on step ladders having said hook disposed below said platform and, accordingly, on the same side thereof as said brace arm, and means for cooperatively interengaging said hook and brace arm to hold the brace arm engaged with the bottom of a step of said ladder whereby said platform and cans held thereby are secured to the ladder step and ladder.

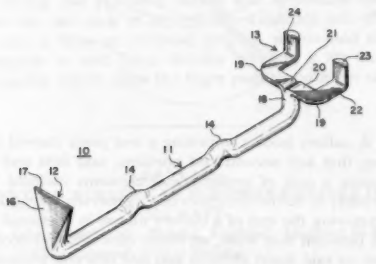


4,013,252

HANGER BRACKET FOR MERCHANDISE

Leslie Braverman, Spring Valley, N.Y., assignor to Solo Products Corporation, Englewood, N.J.

Filed Dec. 15, 1975, Ser. No. 641,104
Int. Cl.² A47F *5/00*
U.S. Cl. 248—220.4 **6 Claims**



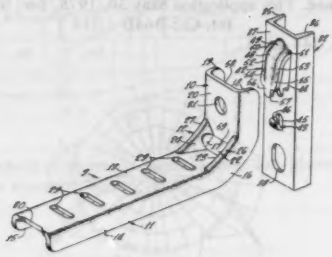
1. An article support bracket device integrally formed of a single rod and mountable on a perforated board comprising a forwardly directed longitudinal support shank of circular transverse cross-section terminating at its rear in an upwardly directed base leg, and a pair of opposite transversely outwardly and rearwardly projecting coupling sections integrally formed with and extending from the rear of said shank and terminating in laterally spaced upwardly directed retainer legs, said coupling sections including first arms projecting laterally outwardly from the top end of said base leg and a second arm projecting rearwardly from the outer end of each of said first arms and terminating in one of said retainer legs, said arms and retainer legs being of semicircular transverse cross section, said arms having upwardly facing planar faces and said retainer legs having forwardly facing planar faces.

4,013,253

BRACKET SUPPORT

Frederick Perrault, 2644 W. 225th St., Torrance, Calif. 90505, and Raymond E. Perrault, 2404 Colt Road, Rancho Palos Verdes, Calif. 90274

Filed Nov. 19, 1975, Ser. No. 633,421
Int. Cl.² A47F *5/00*
U.S. Cl. 248—223.3 **17 Claims**



1. In combination with a bracket having a part adapted for connection to a support, said part including an upper edge, a lower edge, and means defining an upwardly facing abutment surface intermediate said edges and facing towards said upper edge, said upper edge, lower edge and abutment being spaced fixed distances from each other, a support for said bracket comprising

a member having a surface, and opposed tabs outwardly of said surface,

the first of said tabs overlapping said part of said bracket upwardly of said lower edge thereof,

the second of said tabs overlapping said part of said bracket downwardly of said upper edge,

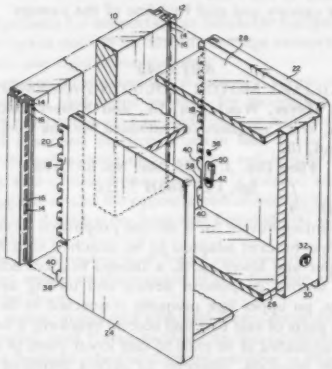
said second tab having a portion in juxtaposition with said upwardly facing abutment surface for retaining said bracket against upward movement.

4,013,254

MOUNTING CLIP LOCK

Bruce K. Boundy, Holland, and Robert J. Munsey, Grand Rapids, both of Mich., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 7, 1976, Ser. No. 647,028
Int. Cl.² A47G *29/02*; A47F *5/08*
U.S. Cl. 248—243 **3 Claims**



1. A locking mechanism for securing an element to a slotted standard, said slotted standard having a plurality of linearly aligned equidistantly spaced slots therein; said element comprising a body member, a tab clip having a plurality of linearly

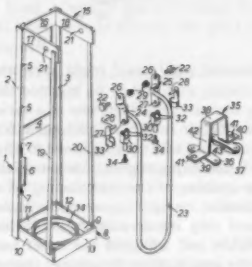
aligned equidistantly spaced hook-shaped tabs fixed to said body member and extending from at least one edge thereof, said hook-shaped tabs being constructed and arranged to enter the slots in said slotted standard and be hooked thereinto; a locking tab mounted for limited slidable movement on said body member, said locking tab including at least one detent extending therefrom and linearly aligned with said hook-shaped tabs, said locking tab being slidable between a first position wherein said at least one detent is spaced from said hook-shaped tabs a distance equivalent to a multiple of said equidistant spacing and a second position different from any multiple of said equidistant spacing; said locking tab further including an aperture therethrough, and a locking pin and spring combination, said spring continuously urging said locking pin against said locking tab whereby when said locking tab is in said second position, said locking pin is urged into said aperture thereby securing said locking tab in said second position.

4,013,255

EXTINGUISHER MOUNTINGS

Victor Edward Sentinella, Caterham, England

Division of Ser. No. 460,174, April 11, 1974, Pat. No. 3,921,950. This application Sept. 5, 1975, Ser. No. 610,766
Claims priority, application United Kingdom, Apr. 12, 1973, 17774/73; Oct. 18, 1974, 11384/74
Int. Cl.² A62C *39/00*
U.S. Cl. 248—313 **10 Claims**



1. A mounting for a fire extinguisher, the mounting comprising:

a spine member adapted for fixing in an upright position on a support,

first force applying means mounted at one end of said spine member and projecting transversely therefrom,

second force applying means mounted at the other end of said spine member and projecting transversely therefrom to co-operate with said first force applying means, said second force applying means including an over-centre linkage pivotally connected to said other end of said spine member, said over-centre linkage comprising toggle link means pivotally mounted at one end to the top of said spine member and pivotally mounted at the other end to one end of pivot link means, the other end of said pivot link means being connected to pressure plate means adapted to apply pressure to the top of the extinguisher, said pressure plate means comprising first and second spaced pressure pad means arranged to act on opposite sides of the top of the extinguisher; said first link means comprising first and second pivot link members, said first pivot link member being rigidly attached at one end to said first pressure pad means and said second pivot link member being rigidly attached at one end to said second pressure pad means; and said toggle link means comprising first and second toggle link levers, said first toggle link lever being pivotally connected at one end to one side of the top of said spine member and pivotally connected at the other end to the other end of said first pivot link lever, and said second toggle link lever being pivotally connected at one end to the other side of the top of said spine member and pivotally connected at the other end to the other end of said second pivot link lever, and

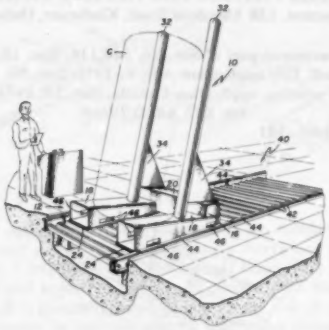
manual operating means connected to said second force applying means and arranged to more said second force applying means from a position away from said first force applying means to a position towards said first force applying means in which position said overcentre linkage is in its over-centre position and said first and second force applying means apply retaining forces to the top and bottom of the extinguisher.

4,013,256

COIL HANDLING PALLET

William J. Hill, Holden, Mass., assignor to Morgan Construction Company, Worcester, Mass.

Filed Apr. 24, 1975, Ser. No. 571,372
Int. Cl.² B65D *19/44*
U.S. Cl. 248—346 **8 Claims**



1. In a rolling mill, a pallet for use in supporting a cylindrical product coil during the transfer thereof from one location to another, comprising: a generally U-shaped base section having laterally spaced leg members joined at their rearward ends by a bridging member, the upper surfaces of said leg members being inclined downwardly from front to rear, and a pair of support members extending upwardly from the rearward portions of said leg members, said support members being perpendicular to said upper surfaces, whereupon a coil supported on said pallet will have arcuate portions of its lowermost end resting on said inclined upper surfaces, with the inclination of said surfaces causing the coil to assume an inclined position resting against said support members.

4,013,257

CHAIR CONTROL

Kenneth N. Paquette, Muskegon, Mich., assignor to The Shaw-Walker Company, Muskegon, Mich.

Continuation of Ser. No. 569,110, April 17, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,299
Int. Cl.² A45D *19/04*
U.S. Cl. 248—379 **13 Claims**

1. A chair control including:

a pair of chair seat supporting arms,

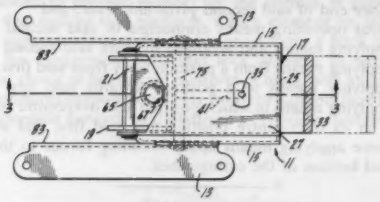
a post cap adapted to be mounted on a chair post,

a spring housing pivotally connected at one end thereof to said post cap for rotation about a generally horizontal axis,

at least one compression spring positioned in said spring housing and engaging a wall of said housing located at the end of the housing away from said pivotal connection,

a spring retaining member engaging the opposite end of said spring with said member pivotally mounted on said post cap for rotation about a generally horizontal axis and said spring biasing said member in an upward direction, and

means connecting said spring housing and said spring retaining member so that rotation of said spring housing



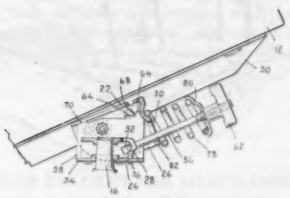
about its pivotal connection to said post cap will bring about rotation of said spring retaining member about its pivotal mounting to said post cap.

4,013,258

CHAIR CONTROL FOR TILTABLE CHAIRS

Frank Doerner, 138 Aberdeen Road, Kitchener, Ontario, Canada

Continuation-in-part of Ser. No. 540,116, Jan. 10, 1976, abandoned. This application Apr. 6, 1976, Ser. No. 674,222
Claims priority, application Canada, Dec. 24, 1974, 216923
Int. Cl.² A45D *19/04*
U.S. Cl. 248—381 **2 Claims**



2. In a chair control for a tilting chair which comprises a fixed first frame member mounted in a fixed position on a chair post, a co-operating second frame member pivotally connected to said first frame member and attachable to the undersurface of a chair seat, biasing means connecting the first and second frame members and adapted to return said chair seat to a substantially horizontal position of rest after the chair seat has been tilted backwards, said biasing means consisting essentially of a bolt having at one end, an elongated head of vee shaped cross-section with the vee pointing towards the other end of the bolt, the improvement comprising said first frame member consisting of a base plate with a pair of upwardly extending arms formed integrally therewith, and an inner plate with a pair of spaced apart feet extending forwardly and downwardly from the front of said inner plate to form a slot therebetween, said bolt projecting through said slot formed between said feet with the point of the vee pivoting on the inner surface of the legs, and the ends of the pair of spaced apart feet extending downward through a pair of corresponding slots in said base plate of said first frame member.

4,013,259

MOLD APPARATUS FOR FORMING RINGS

David H. Tryon, 16880 Wing Lane, La Puente, Calif. 91744

Filed July 21, 1975, Ser. No. 597,770
Int. Cl.² B22C *9/24*; **B29C** *1/14*
U.S. Cl. 249—57 **5 Claims**

1. A mold apparatus for forming various sized wax castings for finger-rings, comprising:

a drum-housing, slightly larger than a finger ring; having a casting-bore disposed therein;

a lower end-plate arranged to be removably received over the lower end of said drum-housing;

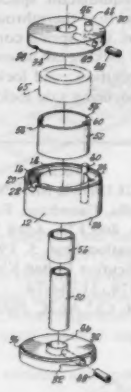
an upper end-plate arranged to be similarly removably received over the upper end of said drumhousing;

said drum-housing and said upper and lower end-plates thereby defining a casting chamber therein;

means, comprising a single supportpost, for removably securing said endplates to said drum-housing;

said support-post being positioned in the finger-opening of the wax-casting of a finger-ring;

said support-post coacting with said drum-housing to define a casting cavity corresponding to the wax-casting of a fingerring;



means positioned within said mold apparatus for allowing the wax casting material to be injected therein;

finger sizing means, comprising one of a variety of predeterminedsized finger-ring bands adapted to be removably positioned within said casting bore, to encircle the outer surface of said support-post, for establishing the size of the finger-opening of the wax casting of a finger ring;

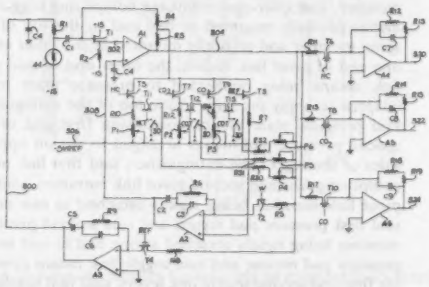
ring sizing means, comprising one of a variety of predetermined-sized ring bands adapted to be removably positioned within and adjacent the inner surface of drumhousing, for establishing the overall size of the wax-casting of a fingerring.

4,013,260

GAS ANALYZER

Edward A. McClatchie; Dean A. Watson, both of Berkeley, and Irvin G. Burough, Walnut Creek, all of Calif., assignors to Andros, Incorporated, Berkeley, Calif.

Filed Sept. 27, 1974, Ser. No. 509,838
Int. Cl.² G01J *1/00*; **G01N** *21/24, 21/26*
U.S. Cl. 250—343 **27 Claims**



1. A gas analyzer comprising:

an infrared energy source for repetitively directing along an

optical path and toward a sample cell first infrared energy having a first wave length generally different from the wave lengths absorbed by a gas sample, second infrared energy having a second wave length, at least some of which will be absorbed by a gas sample, and substantially no infrared energy;

a sample cell disposed in said optical path, said sample cell having substantially infrared transparent windows to allow infrared radiation to pass therethrough;

detector means sensitive to infrared radiation in said optical path passing through said sample cell, said detector means comprising a photodetector coupled to a controllable power source;

synchronizing means for providing signals indicative of the state of radiation being emitted from said infrared energy source;

electronic means coupled to said synchronizing means and said detector means for providing a first signal of a first predetermined level when said infrared energy source is directing said first infrared energy along said optical path, for providing a second signal of a second predetermined level when said infrared energy source is directing substantially no infrared energy along said optical path, and for providing a third signal of a level substantially equal to said first signal level when said infrared energy source is directing said second infrared energy along said optical path and said sample cell is substantially free of the gas to be detected;

said electronic means including automatic gain control means coupled to said power source to maintain the difference in said first and second signal levels at a predetermined level, whereby the difference in said third and first signal levels is indicative of the gas to be detected in the sample cell.

4,013,261

DEVICE FOR PRODUCING WORK PIECES PERFORATED BY MEANS OF ELECTRON BEAMS

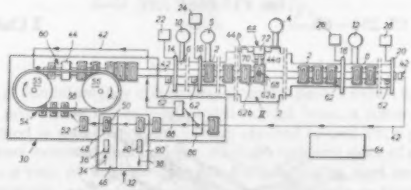
Karl Heinz Steigerwald, Starnberg; Dietor König, Munich-Neuaubing; Wilhelm Scheffels, Germering, and Klaus Glieneck, Munich, all, Germany, assignors to Steigerwald Strahltechnik GmbH, Munich, Germany

Filed Oct. 16, 1975, Ser. No. 622,947

Claims priority, application Germany, Oct. 16, 1974, 2449265

Int. Cl.² H01J *37/00*

U.S. Cl. 250—453 **30 Claims**



1. A device for perforating foil blank work pieces with an electron beam comprising:

an electron beam source;

an evacuatable electron beam work chamber coupled to said electron beam source for receiving the electron beam in a work area;

input and output gating means for said work chamber providing entrance and exit of the work pieces to and from the chamber, said gating means including air locks for maintaining the evacuation of said chamber;

a transport appliance having a transport track extending through the work area of said chamber at a location removed from said electron beam, across said air locks and between said input and output gating means;

a plurality of work piece carriers for receiving the work pieces in a predetermined position, said work piece carriers being adapted to be serially transported on said track and to be detachable therefrom; and

transport control means for displacing the work piece carriers from said track at said work area for placing said work pieces in said electron beam for perforating the work pieces.

4,013,262

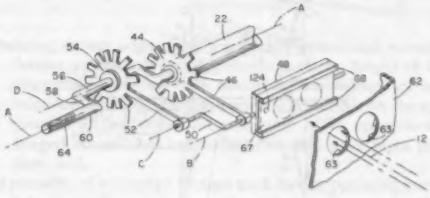
ROTARY APPARATUS FOR MOVING WORKPIECES THROUGH TREATMENT BEAM WITH CONTROLLED ANGLE OF ORIENTATION AND ION IMPLANTER INCORPORATING SUCH APPARATUS

Charles M. Schott, Jr., Gloucester, and Geoffrey Ryding, Manchester, both of Mass., assignors to Varian Associates, Palo Alto, Calif.

Filed Dec. 13, 1974, Ser. No. 532,383

Int. Cl.² H01J *37/00*

U.S. Cl. 250—492 A **21 Claims**



1. An apparatus for distributing a beam substantially uniformly over a workpiece comprising a workpiece holder exposed to a treatment zone having said beam, first means for rotating said holder in a generally circular path about a first axis which is generally perpendicular to the axis of said beam, second means for counter-rotating said holder about a second axis parallel to said first axis at a rate dependent upon the rate of rotation of said holder about said first axis to provide, in cooperation with said first means, a constant angle of orientation of said holder relative to said beam, and third means for producing relative translational motion between said workpiece and said beam in a direction parallel to said first axis.

4,013,263

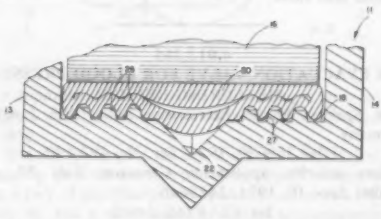
CLAMP FOR REGULATING FLUID FLOW THROUGH PLASTIC TUBING

Marvin Adelberg, 4043 Cody Road, Sherman Oaks, Calif. 91403

Filed Dec. 24, 1975, Ser. No. 644,166

Int. Cl.² F16K *7/06*

U.S. Cl. 251—6 **8 Claims**



1. In a clamp for regulating fluid flow through plastic tubing having a body portion with a longitudinal clamping surface, a variable cross-section longitudinal channel being formed in or along said surface and a roller wheel mounted in said body for longitudinal motion parallel to said clamping surface, the tubing being clamped between the roller wheel and said surface, the improvement comprising:

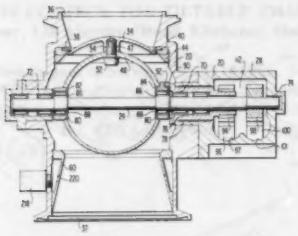
a plurality of distributed raised portions separated from each other by discrete valley portions formed in said clamping surface for locally gripping the tubing wall at given locations, the height of said raised portions above the lowest point of said valley portions and the separation between said raised portions having magnitudes of the order of the compressed wall thickness of the tubing, thereby constraining the tubing so as to reduce creep thereof.

4,013,264

FLOW CONTROL VALVE WITH ISOLATED SEQUENCE CONTROL MECHANISM

Morley V. Friedell, Wheat Ridge, Colo., assignor to Martin Marietta Corporation, Rockville, Md.

Filed Aug. 14, 1975, Ser. No. 604,760
Int. Cl.² F16K *31/04, 39/06*
U.S. Cl. 251—56 **23 Claims**



1. In a spherical poppet valve of the type wherein a spherical valve poppet is pivotably mounted within a spherical valve casing for rotation from a first axially in-line position with respect to an annular valve seat to a second valve open position at an angle thereto and outside of the axial flow path through the seat opening, and shaft means are provided for rotating said valve poppet and for axially shifting said poppet relative to said seat when in axial alignment with said opening to fully close the said valve, the improvement wherein:

a radially compressible spring loading flow tube is mounted within said casing for rotation between an axially in-line position with respect to said annular valve seat and a position generally at right angles thereto, said flow tube is movable laterally at right angles to its axis, and

means for mounting said spherical valve poppet on the side of said flow tube at a position such that said flow tube during radial compression spring biases said valve poppet against said valve seat when said spherical valve poppet is axially shifted into peripheral contact with said annular valve seat during lateral shifting of said flow tube which is at right angles to said seat, toward said valve seat to fully close said valve.

4,013,265

AIR EVACUATION VALVE FOR BLOOD PRESSURE MEASURING DEVICE

Blasius Speidel, Hochmeisterstrasse 244, 7455 Jungingen, Germany

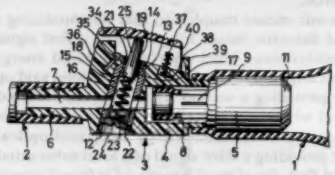
Filed July 30, 1974, Ser. No. 493,120
Claims priority, application Germany, July 30, 1973, 2338596; June 18, 1974, 2429046
Int. Cl.² F16K *24/00*
U.S. Cl. 251—205 **16 Claims**

1. An air evacuation valve for the adjustable slow release of air from a pressurized air system and for the selective quick deflation of said system, which is particularly suited for use in conjunction with a blood pressure measuring device, for example, the valve comprising in combination:

a valve housing having a main bore communicating with said pressurized air system;

a cross bore in said housing extending outwardly from the housing main bore to an outlet to the atmosphere, said cross bore having a bore portion defining a valve seat separating the inside of the housing from said outlet;

a valve plunger received inside the cross bore so as to be axially movable therealong, the valve plunger having a first length portion located axially inside the valve seat and a second length portion extending through the valve seat to the outside of the housing, the second plunger length portion cooperating with the valve seat so as to progressively open an air throttling passage between it and the valve seat, in response to a displacement of the valve plunger towards the inside of the housing within the range of a predetermined axial opening stroke;



means for biasing the valve plunger axially outwardly in opposition to its opening displacement, so as to close said air throttling passage;

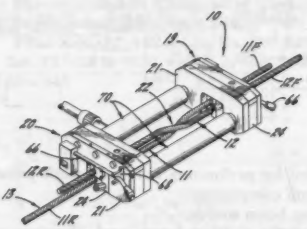
a bypass channel arranged in the second length portion of the value plunger and exgtending from a portion thereof which is always exposed to the atmosphere to a point on the valve plunger which, when the latter has reached the inner end of its normal opening strokes, is positioned within the range of said throttling passage between said second plunger length portion and the valve seat, and which, when the valve plunger is forcibly moved inwardly beyond said end point, connects the inside of the housing with the atmosphere independently of the throttling passage, thereby permitting a quick bypass evacuation of air from the pressurized air system.

4,013,266

CABLE TENSIONING DEVICE WITH IMPROVED LOADING AND REMOVAL CAPABILITY

Ellsworth W. Lapp, c/o Lapp Engineering, 6060 S. 11th St., Rockford, Ill. 61109

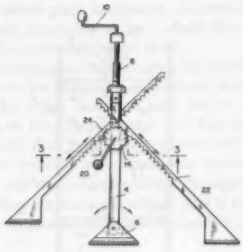
Filed Mar. 4, 1976, Ser. No. 663,969
Int. Cl.² B66F *1/00*
U.S. Cl. 254—69 **2 Claims**



1. A device for tensioning a cable having lapped end sections wrapped around another through an angle which is an odd multiple of 180° whereby a twist is formed in said cable, said first and second end sections having first and second free end portions, respectively, extending in opposite directions from said twist with the axes of the two free end portions being located substantially along the same straight line, said device comprising first and second members spaced from one another along said cable, linear actuating means connected

between said members, said actuating means being operable when actuated in one direction to spread said members apart and being operable when actuated in the opposite direction to draw said members toward one another, said first and second members having first and second cable-receiving throats, respectively, each adapted to accept said first and second cable end sections, first and second gripping elements within the respective throats and each having a longitudinally extending groove for receiving the respective cable free end portion, the groove in said first gripping element being longitudinally in line with the groove in said second gripping element, first and second jaws disposed in opposing relation with said first and second gripping elements, respectively, said first and second jaws having first and second longitudinally extending grooves, respectively, disposed in opposing relation with the grooves of the respective gripping elements, the groove in said first jaw being longitudinally alined with the groove in said second jaw, means on said members for moving said jaws toward and away from said gripping elements between clamped and released positions, said jaws and said gripping elements clamping the respective cable free end portions in the respective grooves when said jaws are in said clamped positions and releasing the cable free end portions when said jaws are in said released positions, said gripping elements and said jaws being attached to and movable in unison with the respective members as the latter are spread apart and drawn toward one another and being operable to pull the clamped first and second cable free end portions in opposite directions along said line as said members are spread apart whereby tension is placed in said cable.

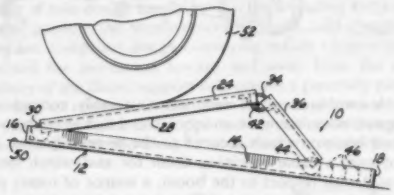
4,013,267
PENDULUM JACK
Norman W. Kirk, 9 Rosedale Ave., Montclair, N.J. 07042
Filed June 1, 1976, Ser. No. 691,425
Int. Cl.² B66F *3/08*
U.S. Cl. 254—85 **1 Claim**



1. A pendulum jack comprising a central post, a swivel base, said post being pivotally mounted in said base, a screw lift disposed in said post, a chain hook secured to said lift, a pair of gears mounted on a common shaft on opposite sides of said post, a pair of legs having rack teeth engaging said gears, respectively, and adapted to be moved oppositely in translation in a direction depending on the selected angle of pivot for said post.

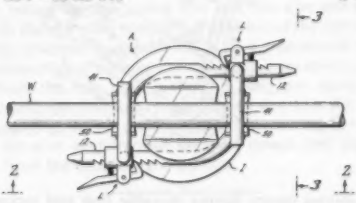
4,013,268
VARIABLE PITCH VEHICLE WHEEL SUPPORT RAMP
Hugh M. Williams, 34 N.E. 37, Oklahoma City, Okla. 73105
Filed Mar. 8, 1976, Ser. No. 665,020
Int. Cl.² E02C *3/00*
U.S. Cl. 254—88 **1 Claim**

1. A vehicle wheel supporting device, comprising:
an elongated channel-shaped base having upstanding legs and a bight portion adapted to flatly contact the surface of the earth and having an upstanding stop forming wall at its respective ends;
hingedly connected ramp means transversely and longitudinally overlying an intermediate portion of said base between said legs and said stop walls,
said ramp means comprising a channel-shaped elongated ramp having an upwardly disposed bight portion forming a planar wheel supporting surface, and
a channel-shaped ramp brace of less length than said ramp,
the hingedly connected end portions of said ramp means being vertically movable toward and away from said base about the axis of the hinge connection;



bearing means comprising a generally cylindrical member having a radius of less dimension than the height of the respective said stop wall extending transversely of and connected in depending supporting relation with the end portion of said ramp and said ramp brace opposite the hinged connection and slidable on said base bight portion; and,
a plurality of elongated wedges each having opposing parallel side surfaces interposed in side by side relation between one said bearing means and one said stop wall for maintaining said ramp and said ramp brace on an incline with respect to said base.

4,013,269
WIREGUIDE-TRANSPORT APPARATUS
Jack R. Lovett, 1900 Irwing, Orange, Tex. 77360
Filed Dec. 19, 1975, Ser. No. 642,580
Int. Cl.² B65H *59/00*
U.S. Cl. 254—134.3 PA **5 Claims**



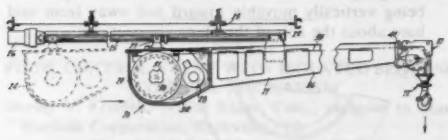
1. An apparatus for supporting and guiding a wire cable as it is pulled axially into position atop a high top insulator, comprising:
a. a removable support means adapted to be affixed to a high top insulator, said removable support means including a pair of interfitting L-shaped segments each having a long leg and a short leg disposed at approximately 90° with respect to one another and having a bore formed at the end of the short leg for receiving the end of the long leg of the other segment in latch means for latching the long leg in said bore;
b. roller means carried on said support means and extending transversely with respect to the longitudinal axis of the cable for engaging and supporting said cable as it is moved axially into position on an insulator.

4,013,270

COMBINED WINCH AND BOOM ASSEMBLY

Elmer Laky, Cranford, and Ralph Walsh, Oceanport, both of N.J., assignors to Breeze Corporations, Inc., Union, N.J.

Filed Mar. 29, 1976, Ser. No. 671,548
Int. Cl.² B66D 1/48
U.S. Cl. 254—173 R 8 Claims



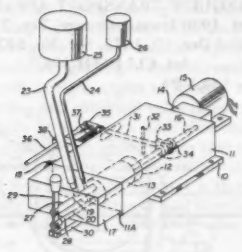
1. A combined winch and boom assembly comprising an elongated boom member, an inboard end and an outboard end on said boom, a winch secured to the boom adjacent its inboard end, a cable receiving drum for said winch laterally disposed with respect to the boom, a source of rotary power for said drum, an output shaft connected to the source of rotary power and extending outwardly of said boom, lateral fastening means to couple the drum to the extended portion of the output shaft, a cable for the said drum, a traction sheave carried by the outboard end of the boom to receive the cable therethrough, a traction pulley in said sheave, a latch plate on said traction sheave swingably carried by said traction sheave above said pulley and a cable pendant swingably carried by the latch plate to receive and guide the cable passing through the traction sheave.

4,013,271

MIXING DEVICE

James H. Hoskinson, 10118 Duck Creek Road, Salem, Ohio 44460

Filed Sept. 18, 1975, Ser. No. 614,628
Int. Cl.² B01F 7/12, 13/00
U.S. Cl. 259—2 6 Claims



1. A mixing device having movable first and second body members with oppositely disposed engaging surfaces, a cylindrical bore formed in said first body member inwardly from the surface thereof and a flat surfaced circular member movably positioned in said cylindrical bore, means for imparting rotational and translational motion to said circular member, said second body member having a pair of tubular bores therein extending transversely from the surface thereof and positioned for registry with the surface of said circular member in the first body member when the body members are in engaged relation, valve elements slidably disposed in said tubular bores and passageways in said second body member communicating with said tubular bores and comprising means by which materials to be mixed may be delivered thereto, said valve elements movable longitudinally of said tubular bores from first positions flush with the surface of said second body member to second positions inwardly thereof beyond said communication passageways and whereby material in said tubular bores is moved outwardly of the surface of the second body member when said valve elements close said communicating passageways.

4,013,272

INLINE MIXER

Willis G. Routson, Walnut Creek, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 2, 1973, Ser. No. 329,151
Int. Cl.² B01F 5/06
U.S. Cl. 259—4 R 2 Claims

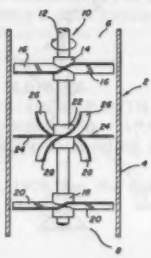
1. A mixer, the mixer comprising a conduit having an inlet, a fluid source in operative engagement with the inlet end, an outlet having a discharge means, the conduit defining an internal passage having an entrance end and an exit end, the internal passage extending from the entrance end to the exit end, the conduit having an internal passage wall, the conduit being a shrunken tube, the tube being shrunken about a chain disposed within the passage, the chain comprising a plurality of links, said links and said passage wall defining at least one torturous passage extending through said links and the tube forms a generally minimal surface over the chain.

4,013,273

METHOD OF, AND MIXER FOR INTIMATE BLENDING OF FINE, DRY, PARTICULATE SOLID MATERIALS WITH MOIST WET OR SLURRIED PARTICULATE SOLID MATERIALS

George Jack Danyliw, Sudbury, Canada, assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Oct. 30, 1974, Ser. No. 519,128
Claims priority, application Canada, Dec. 19, 1973, 188485
Int. Cl.² B01F 7/20
U.S. Cl. 259—8 17 Claims



1. A blender for a particulate feed comprising an open ended, substantially tubular enclosure having an inlet end and an outlet end and an impeller positioned within the enclosure, the impeller comprising:

a. a rotatable spindle positioned substantially axially within the enclosure and having blades mounted upon it including,

b. a first set of blades that are radially extending, positioned relatively close to the inlet end, and pitched to advance the feed toward the outlet end;

c. a second set of blades that are radially extending, positioned relatively close to the outlet end, and pitched to advance the feed toward the outlet end, the second set of blades having an average pitch less than the pitch of the first set of blades;

d. a third set of blades containing radially extending and curved blades positioned between the first and second set of blades, said third set of blades including at least one group of blades curved towards the first set of blades and at least one group of blades curved towards the second set of blades.

4,013,274

APPARATUS FOR GUIDING AND SEATING A STIRRER SHAFT FOR LABORATORY OR INDUSTRIAL GLASS APPARATUS

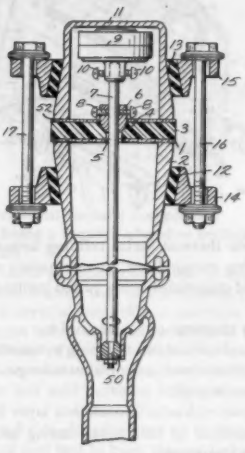
Günter Hering, Michelbach, and Werner Engels, Rodenbach, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed June 3, 1976, Ser. No. 692,372

Claims priority, application Germany, June 5, 1975, 2524911

Int. Cl.² B01F 7/22

U.S. Cl. 259—102 **9 Claims**



1. Apparatus for guiding and sealing a stirrer shaft for laboratory or industrial glass apparatus, comprising:

a stirrer shaft, rotatable about a shaft axis;

a housing for containing said shaft;

an abutment means in said housing for contacting said shaft;

bearing means for mounting said stirrer shaft in said housing so that the angle between said stirrer shaft axis and a vertical axis may be adjusted, said bearing means including a smooth disc having a concentrically disposed spherical recess therein, a conical bore located at the lowest point of said recess and passing through said disc, and a body having a spherical surface and a central axial bore rotatably mounted in said spherical recess of said disc; and

means for affixing said stirrer shaft in said bore of said body so that it projects through said bore in said disc and extends to said abutment.

4,013,275

APPARATUS FOR DIVIDING AND KNEADING A PIECE OF DOUGH

Herbert Schröder, and Reinhard Schröder, both of Angerstrasse 5, 8623 Staffelstein, Ofr., Nurnberg, Germany

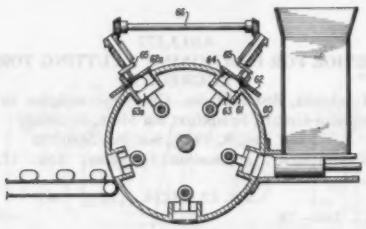
Filed Aug. 8, 1975, Ser. No. 603,123

Claims priority, application Germany, Aug. 9, 1974, 2438316

Int. Cl.² A21C 7/06

U.S. Cl. 259—185 **9 Claims**

1. In an apparatus for separating and kneading portions of dough including drum means rotatably mounted on a frame for rotating step-by-step in a constant direction of rotation; means connected to said drum means for initiating the step-by-step movement, said drum means including at least three circumferentially-spaced measuring chambers; dough supply means adjacent the outer circumference of said drum means for periodic alignment with the respective measuring chambers; kneading means adjacent the periphery of said drum means for engaging dough in the measuring chambers and kneading the same; an exit portion adjacent the outer periphery of the drum means having associated therewith means for removing the kneaded dough from the drum means, said drum means having an inactive period, between two rotational steps, in which actuating means activate said dough supply means to feed a portion of dough into a first of said measuring chambers, and activate said removing means such that kneaded dough is removed at said exit portion from the third of said measuring chambers; reciprocating measuring-flask means in each of said measuring chambers; and control means for controlling the rotation of the measuringflask means in the position of said dough supply means, the kneading means and said exit portion, the improvement in which, said dough supply means comprises dough conveying means reciprocatably supported for movement toward and away from the outer periphery of the drum, support bars oriented generally parallel to the axis of rotation of said drum means and connected to said measuring flasks and supported on said drum for radial movement toward and away from the outer periphery of the



drum for moving said measuring flasks in a corresponding direction, cam disc means rotatably supported on an axis of rotation parallel to said support bars for operatively engaging and radially moving the support bars, means for manually adjusting the position of said cam disc means to adjust the length of the reciprocating movement of the measuring flasks; at least one cam rail engageable with said support bars for retaining them in a path of movement orienting the measuring chambers in an operative position relative to the kneading means; and a second cam device supported for oscilatory movement and engagable with the cam rail for controlling the radial position of the measuring flasks relative to the kneading means, means for positioning said first cam disc and said cam rail such that for each operational position of the cam disc and cam rail wherein a support bar is in a transitional position therebetween, the support bar can have a transitional movement from the cam disc to the cam rail; and ejection lever means, said ejection lever means being operable for sequentially engaging the support bars of the measuring flasks arriving at the exit portion with kneaded dough and urging the dough from the measuring chambers.

4,013,276

EXTRUDERS AND INJECTION MOULDING MACHINES

Ambrose C. Boham; John C. Davies, and Brian J. Kendall-Smith, all of Birmingham, England, assignors to British Industrial Plastics Limited, Manchester, England

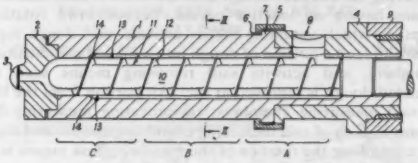
Filed Mar. 19, 1975, Ser. No. 559,980

Int. Cl.² B29B 1/10

U.S. Cl. 259—191 **6 Claims**

1. A screw-housing for extruder and injection moulding machines, within which screw-housing there is defined a longitudinally extending bore for reception of a rotary screw, said bore having a feed zone characterised in that said screw-housing is particularly adapted for the feeding of thermosetting plastics material in the form of a fine powder and in the internal surface of the bore there is defined grooving which extends longitudinally throughout a major portion of the length of the screw-housing downstream of the feed zone thereof, said bore

terminating in a discharge opening, and said grooving terminating in spaced relation to that part of said bore coupled to



said discharge opening wherein a terminal portion of said bore is free of said grooving.

4,013,277

DEVICE FOR POSITIONING A CUTTING TORCH AGGREGATE

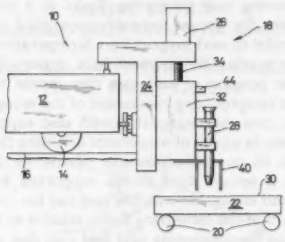
Ewald Schmitt, Bischofsheim, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed Apr. 9, 1975, Ser. No. 566,395

Claims priority, application Germany, Apr. 11, 1974, 2417694

Int. Cl.² B23K 7/10

U.S. Cl. 266—76 **5 Claims**



1. A device for positioning a cutting torch aggregate a predetermined distance from a workpiece comprising, in combination, a movable sled as part of said aggregate, torch means mounted to said sled for joint movement therewith, drive means for moving said sled up and down toward and away from the workpiece, said drive means including a spindle, means for rotating said spindle, a nut engaged with said spindle mounted for relative movement with respect thereto, said sled disposed for resting against said nut whereby the vertical positioning of said sled is determined by the relative movement of said nut, spacing means mounted to said sled and extending beyond said torch means for contacting the workpiece when said torch means is closer than the predetermined distance while said nut is being moved in its relative lowering direction, control means on said sled and said nut and connected to said spindle rotating means for reversing the direction of relative movement of said nut to its raising direction upon contact of said spacing means with the workpiece to thereby raise said sled until said torch means is at said predetermined distance, said control means including a movable control lever which activates said rotating means when said control lever is in a predetermined position, a stud connected with said nut for joint movement therewith, and said control lever being in the path of movement of stud whereby said control lever may be moved to said predetermined position upon contact by said study.

4,013,278

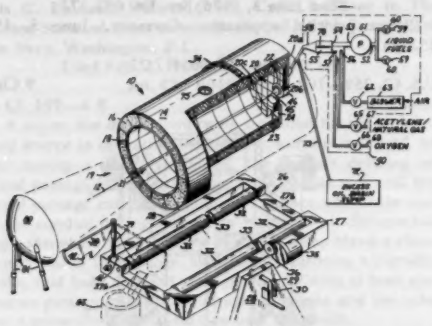
PORTABLE THERMAL METAL REFINING APPARATUS

Philip J. O'Donoghue, 6 E. 45th St., Minneapolis, Minn. 55409

Filed Jan. 30, 1975, Ser. No. 545,295

Int. Cl.² F27B 7/00

U.S. Cl. 266—213 **9 Claims**



7. A portable thermal metal refining apparatus for selectively reclaiming metals from a combination or mixture load of a plurality of materials having varied melting temperatures, comprising:

a. a refining chamber characterized by:

i. a rigid cylindrical outer casing symmetrically disposed for rotation about a central axis longitudinally extending therethrough;

ii. a firebrick refractory insulation layer lining the entire inner surface of said outer casing and mounted for rotation therewith;

iii. a thin cylindrical smooth, non-porous glass layer lining the inner surface of said firebrick;

iv. end plate means for sealingly closing one end of said refining chamber, said end plate means defining with said glass lining layer a cylindrical internal reduction cavity, said end plate means having an opening therethrough axially aligned with said central axis; and

v. that end of said refining chamber oppositely disposed from said end plate means remaining completely open, to substantially the same diameter of that of said reduction cavity for enabling unencumbered introduction of a load therethrough to said internal reduction cavity;

b. support means for rotatably supporting said refining chamber for rotation about said central axis;

c. drive means operatively connected to said refining chamber for controllingly rotating said chamber about said central axis;

d. means for pivotally controlling the longitudinal inclination of said refining chamber, selectively enabling either said open or said closed end of said refining chamber to be positioned relatively lower than said respective opposite end thereof without interferring with the rotational motion of said refining chamber about said central axis;

e. burner nozzle means fixedly mounted external of said refining chamber and operatively projecting through said opening in said end plate means for directing a reducing flame obliquely toward said load resting upon the lower portion of said internal reduction cavity;

f. fuel supply means operatively connected with said burner nozzle means for controllingly supplying a pressurized mixture of selected fuels and air to said burner nozzle means; and

g. free-standing reflector means operatively positioned in confronting spaced apart alignment with said open end of said refining chamber for reflecting heat back into said internal reduction cavity.

4,013,279
TREATMENT FURNACE

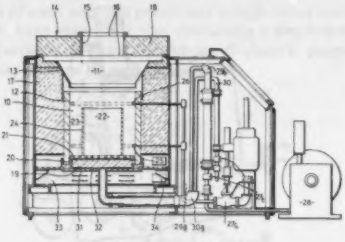
Michael John Virr, Stourbridge, England, assignor to Fluidfire Development Limited, England

Filed Aug. 5, 1974, Ser. No. 495,017

Claims priority, application United Kingdom, Aug. 9, 1973, 37708/73

Int. Cl.² C21D *1/74*

U.S. Cl. 266—249 **4 Claims**



3. A heat treatment furnace comprising:

a. means defining a furnace chamber including a top and a bottom wall;

b. a bed of solid particles contained in the chamber and lying on said bottom wall of the chamber;

c. an annular, vertical, imperforate partition in the chamber separating an outer combustion zone of the bed from a treatment zone of the bed, said outer combustion zone having an annular configuration surrounding said treatment zone and said partition having upper and bottom edges;

d. feed means for feeding fuel and air to said outer combustion zone of said bed to burn therein to heat and fluidize said outer combustion zone and for feeding a treatment gas to said treatment zone of said bed to fluidize said treatment zone;

e. said bottom edge of said partition and said bottom wall of said chamber defining therebetween a gap through which said zones communicate; and

f. said upper edge of said partition and said top wall of said chamber defining therebetween a further gap through which said zones communicate;

g. whereby, during operation, particles of said bed which have been heated by combustion occurring in said combustion zone are caused to continuously flow upwardly in said outer combustion zone through said further gap between said upper edge of said partition and said top wall from said outer combustion zone to said treatment zone, downwardly through said treatment zone to transfer heat to said treatment zone, and through said gap between said lower edge of said partition and said bottom wall into said outer zone.

4,013,280
WORKPIECE POSITIONING TABLE

Anwar Chitayat, 8 Gilbert Lane, Plainview, N.Y. 11803, and Stanley J. Squires, 27 Marbourne Road, Bethpage, N.Y. 11714

Filed Aug. 9, 1976, Ser. No. 712,596

Int. Cl.² B23Q *3/02*

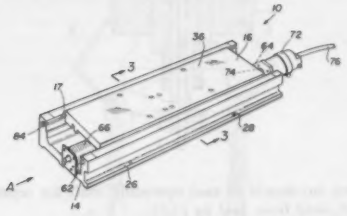
U.S. Cl. 269—60 **8 Claims**

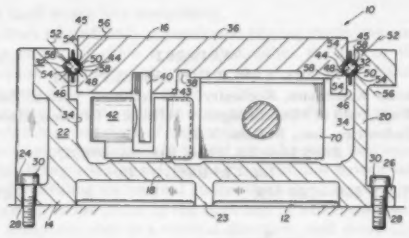
1. A workpiece positioning table comprising in combination:

a generally channel-shaped base member having a bottom web element and a pair of laterally spaced side wall elements projecting upwardly therefrom, at least one of said side wall elements being pre-tensioned under the influence of a predetermined load so as to provide a spring force tending to flex said side wall element inwardly towards the other of said side wall elements;

a V-shaped notch formed in the inner face of each of said side wall elements at a location above said bottom web element and in vertically aligned relation, said notches extending lengthwise of the respective side walls;

an elongated carriage member carried by said side wall elements for reciprocatory movement therealong, a V-shaped notch formed in each of the longitudinally extending outer edges of said carriage extending lengthwise of said respective outer edges;





sets of cross-mounted roller elements positioned within the adjacently aligned V-notches of said carriage and base members so as to rollably mount said carriage on the side walls of said base member;

means for reciprocably moving said carriage member;

and means for determining the extent of linear movement of said carriage member;

whereby the pre-tensioning force of said at least one side wall element is sufficient to maintain said carriage member in aligned mounted relation on said side wall elements.

4,013,281
JIG DRIVING APPARATUS

Yoshio Tokunaga, Higashikurume, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Sept. 26, 1975, Ser. No. 616,871

Claims priority, application Japan, Oct. 17, 1974, 49-118684

Int. Cl.² B23Q *3/18*

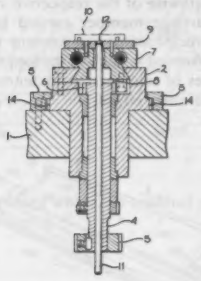
U.S. Cl. 269—61 **8 Claims**

1. A jig of the type comprising a jig body, a jig operating plate movably coupled to said jig body, a jig plate for holding a workpiece mounted on the upper surface of said jig operating plate, and a jig driving means, the improvement comprising:

a driven shaft, said shaft being hollow and rotatably mounted in the central part of said jig body;

a means for converting rotation of said driven shaft to movement of said jig operating plate; and

an operating shaft, said operating shaft being slidably mounted in said driven shaft thereby allowing up and



down movement of said operating shaft for separating a workpiece from said jig plate.

4,013,282

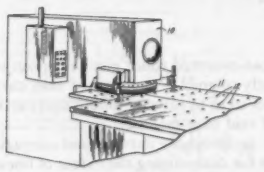
WORK TABLE ROLLER SUPPORT

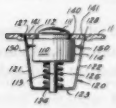
Harold Kaufmann, Rochester, and Kenneth Sprick, Zumbro Falls, both of Minn., assignors to Di-Acro Division, Houdaille Industries, Inc., Buffalo, N.Y.

Filed June 21, 1976, Ser. No. 698,472

Int. Cl.² B65G *13/00*

U.S. Cl. 269—289 MR **5 Claims**





1. In a machine tool having a work piece supporting table, the table having a plurality of spaced apart roller members projecting above a top table surface, the improvement of the roller members comprising roller elements received in a housing, a plurality of openings in the table, said roller member projectable through said openings from an undersurface of said table, means on the housing contacting the undersurface of said table when the roller members are projecting through said openings preventing movement of the housing through said openings, a spring clip having arm portions engaging said table and a bight portion spaced from said undersurface of said table underlying said housing, spring means interposed between said bight portion and said housing urging said housing away from said bight portion, said arms having free ends opposite said bight terminating in outturned flanges, said flanges overlying portions of said table, and blocking means extending between said arms and said housing preventing movement of said arms towards one another when said housing is at a first distance from said bight, said blocking means being out of contact with said housing when said housing is at a second distance with respect to said bight closer to said bight than said first distance whereby said legs are free to move towards one another.

4,013,283

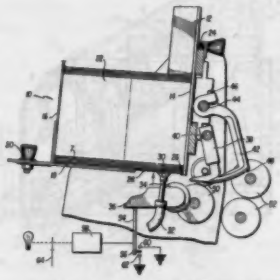
PULL-FOOT SHEET FEEDING DEVICE

Norwood E. Tress, Bath, and Winston A. Orsinger, Bethlehem, both of Pa., assignors to Bell & Howell Company, Phillipsburg, N.J.

Filed Aug. 29, 1975, Ser. No. 608,970

Int. Cl.² B65H *3/08, 3/50*

U.S. Cl. 271—14 **16 Claims**



1. A sheet finding mechanism for feeding individual sheets separately from a stack comprising:

a main hopper assembly for supporting a stack of sheets;

means for drawing an exposed edge of an outer sheet away from the remaining stack;

a pull-foot reciprocally movable between a first position in which it is between the remaining stack and the edge of the outer sheet which has been exposed and a second position in which it is away from the hopper assembly;

roller means arranged to cooperate with the pull-foot, for continuously pinching the outer sheet between it and the pull foot while rolling on the sheet as the pull-foot moves away from the remaining stack and pulls the outer sheet from the remaining stack; and

a further means for relatively moving said roller means and said pull-foot laterally toward each other in timed relation with reciprocations of said pull-foot for pinching the outer sheet between them.

4,013,284

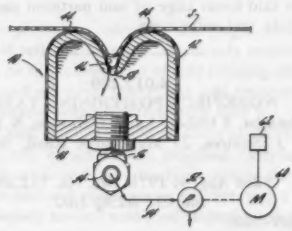
DECURLER DEVICE

S. Gordon Demetre, Branford, Conn., assignor to Eastern Graphic Products, Inc., New Haven, Conn.

Filed Oct. 14, 1975, Ser. No. 622,410

Int. Cl.² B65H *29/04, 29/70*

U.S. Cl. 271—183 **5 Claims**



1. An improved device for decurling curled sheets in a sheet handling apparatus having means for positively moving successive sheets along a delivery path comprising, in combination, an elongated suction bar disposed across the delivery path substantially transverse to the direction of sheet movement, said suction bar having a substantially M-shaped cross section with two smoothly rounded crests whose curvature is in the same direction as the curl of the sheets and a rounded

U-shaped trough between said crests and having a multiplicity of apertures therein, means bridging the legs of said M-shaped cross section below said trough for forming a vacuum manifold closed except for said apertures, means for drawing a vacuum in said manifold, the radius of said trough being substantially less than the radius of said crests so that as a curled sheet is moved across said crests and drawn into said trough by said vacuum it is progressively bent in a compound reverse curvature the sharpest bend of which is opposite the original direction of curl, and said crests and trough being coated with a smooth, hard plastic gel coat containing a dispersion of fine carbon particles and said bar having di-electric properties to electrically destaticize said sheets.

4,013,285

COPYING MACHINE

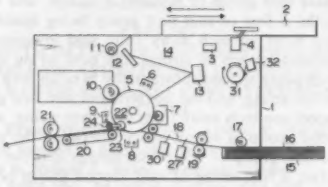
Mitchell V. Green, Natick, Mass.; Yukio Akita, Chiba, and Mitsuji Tachikawa, Tokyo, both of Japan, assignors to Copyer Co., Ltd., Tokyo, Japan

Filed Mar. 5, 1976, Ser. No. 664,180

Claims priority, application Japan, Mar. 6, 1975, 50-30262[U]

Int. Cl.² B65H 7/08

U.S. Cl. 271—261 **6 Claims**



1. In a copying apparatus comprising a copy paper-transporting device, a statically copying rotary drum whose peripheral surface is fitted with a photo-sensitive layer, a copy paper-feeding device for carrying the copy paper delivered from the copy paper-transporting device to the rotary drum, and a copy paper-separating device disposed near one end face of the rotary drum to guide one lateral edge portion of the copy paper projecting outward from the corresponding end face of the rotary drum by a prescribed width in a direction in which said copy paper can be detached from the rotary drum, thereby separating the copy paper statically adhered to the photo-sensitive layer mounted on the peripheral wall of the rotary drum, the improvement which further comprises a moved position-detecting switch for detecting the arrival of the forward end of the copy paper immediately in front of the rotary drum; a projecting width-detecting switch for determining whether one lateral edge portion of the copy paper projects outward from the corresponding end face of the rotary drum by a prescribed width, before the moved position of the copy paper is detected by said moved position-detecting switch; and means for restricting the operation of the copy paper-feeding device to prevent the copy paper from being brought to the rotary drum, in case the projecting width-detecting switch does not detect the projecting width of one lateral edge portion of the copy paper, but the moved position-detecting switch along detects the moved position of the copy paper.

4,013,286

CARD MAGIC BOX

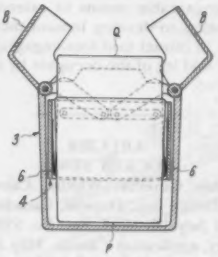
Nobuo Nagai, Yamatokooriyama, Japan, assignor to Nintendo Co., Ltd., Japan

Filed Feb. 19, 1976, Ser. No. 659,554

Claims priority, application Japan, Sept. 13, 1975, 50-126617

Int. Cl.² A63J 21/00

U.S. Cl. 272—8 R **3 Claims**



1. A card magic box comprising:

a. a deck of uniformly-dimensioned playing cards, the configuration of which is such that either the top or the bottom edge of each card in the deck being slightly shorter than the other edge.

b. an outer housing which is open at the top for loading and unloading said deck of cards, and

c. an inner case as disposed in said outer housing, said inner case being open at the top and bottom and having side walls defining an internal space which is generally conforming to the shape of the deck and in which said deck is freely movable in a vertical direction, said inner case further having, in said internal space and adjacent its side walls that would face the corresponding longitudinal edges of said deck of playing cards upon loading of the deck into the inner case, a pair of resilient members as juxtaposed at a spaced interval shorter than the longer of said top and bottom edges of said deck, said resilient member being so configured and disposed that when said deck of cards is loaded into the inner case, it does not act upon the cards (P) positioned the shorter lateral edge down but selectively act upon and grips the card or cards (Q) positioned the longer lateral edge down and that in response to the upward movement of the inner case, the latter card or cards (Q) only are automatically raised.

4,013,287

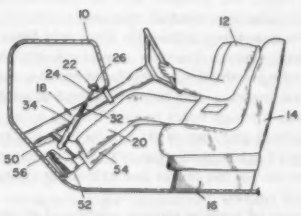
LEG EXERCISE AND FOOT REST FOR AUTOMOTIVE VEHICLES

James J. Dickman, 2715 Durham Road, York, Pa. 17402

Filed Nov. 13, 1975, Ser. No. 631,740

Int. Cl.² A63B 21/04

U.S. Cl. 272—136 **8 Claims**



1. The combination of a leg exercising and rest device for drivers of automotive vehicles comprising; an automotive

vehicle having fixed means adjacent the dash panel thereof and positioned laterally from the brake pedal, an attaching member secured to said fixed means, extensible self-retracting means movably connected at one end to said attaching member and depending therefrom for free swinging support thereby laterally from the brake pedal of said vehicle, and foot-engageable means attached to the depending end of said extensible self-retracting means for reception of the foot of an occupant of the vehicle selectively for supporting and exercising the leg of the occupant attached to said foot by pushing upon said foot-engageable means to extend said extensible self-retracting means to develop tension therein and permitting said tension to retract said foot-engageable member and thereby exercise said leg of the occupant by successive movements as described.

4,013,288

HOCKEY STICK

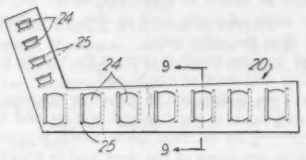
Ludovicus Jacobus Goverde, Whitby, Canada, assignor to Ontario Tool Design Inc., Ontario, Canada

Filed July 14, 1975, Ser. No. 595,693

Claims priority, application Canada, May 20, 1975, 227368

Int. Cl.² A63B *59/14*

U.S. Cl. 273—67 A **4 Claims**



1. A unitary hockey stick molded from foamed nylon and having a blade portion, a shaft portion and a heel portion and a unitary reinforcement sheet member embedded in said blade portion and in the lower end of said shaft portion, the peripheral contour of said blade portion of the reinforcement sheet member substantially corresponding to that of the blade but being slightly smaller than the blade, said reinforcement sheet member further having a shaft section which extends into the lower end of said shaft portion of the stick at said heel portion of the stick.

4,013,289

TENNIS RACKET

Bernard Kaminstein, 329 Franklin Place, Paramus, N.J. 07652

Continuation-in-part of Ser. No. 591,813, June 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 529,705, Dec. 5, 1974, abandoned. This application Apr. 8, 1976, Ser. No. 674,826

Int. Cl.² A63B *51/00*

U.S. Cl. 273—73 D **10 Claims**

1. A racket having improved ball impact properties comprising

a frame defining a central opening.

a handle extending outwardly from said frame,

first string means forming a vertical plurality of strings extending in the direction of said handle, spaced over said central opening and being attached to said frame under tension through holes in said frame,

said vertical plurality of strings including a vertical central group of substantially equally spaced strings, disposed on either side of the center line extending through the handle of said racket,

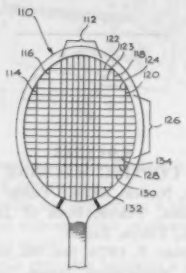
a first pair of vertical strings positioned at one side of said vertical central group of strings, one of the strings in said first pair being spaced one inch from the nearest string of said central group of strings, the other string of said first pair being spaced one inch from said one of said first pair of strings, and

a second pair of vertical strings positioned on the other side of said central group of strings, one of said second pair being one inch from the nearest string in said central vertical group of strings, the other string of said second pair being spaced one inch from said one string of said second pair of strings,

second string means forming a horizontal plurality of strings extending at right angles to said vertical plurality of strings, spaced over said central opening and being attached to said frame under tension through holes in said racket,

said second string means including,

a first group of horizontal strings evenly spaced from one another within the central opening of said racket, the first



string of said first group of strings being positioned substantially 2⅜ inches below the top of said racket,

a first group of three strings spaced between the lowermost of said first group of horizontal strings, and said racket handle, a first of said first group being spaced substantially ¾ of an inch away from said lowermost of said horizontal group of strings, the next string of said first group being spaced substantially ⅞ of an inch away from the first string, and the last string of said first group being spaced one inch away from said next string, and

a second group of strings spaced between the top most of said first group of horizontal strings and the top of said racket, a first string of said second group being spaced substantially ⅝ of an inch away from said topmost string of said first group, and a second string of said second group being spaced substantially ¾ of an inch away from said first string of said second group of horizontal strings.

4,013,290

RACKET FOR TENNIS AND SIMILAR GAMES

Robert Stevens, 552 Glorietta Ave., Newport Beach, Calif. 92660

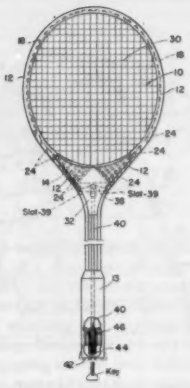
Continuation-in-part of Ser. No. 252,044, May 10, 1972, abandoned. This application Mar. 26, 1973, Ser. No. 344,751

Int. Cl.² A63B *51/12*

U.S. Cl. 273—73 E **8 Claims**

1. A game racket including: an annular head portion composed of a resilient material; a first string for the racket looped through holes in the head portions in a first series of passes extending transversely across the area circumscribed by the head portion, and a second string for the racket looped through holes in the head portion in a second series of passes extending longitudinally across the area circumscribed by the head portion; an elongated handle affixed to the head portion; a neck portion interposed between the handle and the head portion; first and second arms each extending partially around the opposite sides of said head portion on the outer peripheral surface thereof a limited distance adjacent said neck portion, said arms being coupled to the adjacent ends of said second series of passes; and an adjusting means attached to said arms to produce sliding movement of said arms relative to said head

portion along the outer peripheral surface thereof to pull said second series of passes into tension by differential amounts proportional to the individual lengths of the passes of said second series, thereby to compress said head portion and cause said head portion to extend its lateral dimensions,

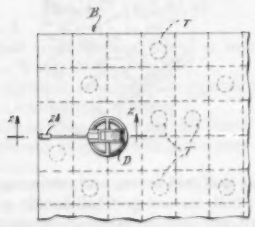


thereby to pull said passes of said first series into tension by differential amounts proportional to the individual lengths of said passes of said first series, so as to distribute the load applied thereto and thereby to pull the first series of passes into tension corresponding to the tension of the second series of passes.

4,013,291
GAME WITH DETECTOR ASSEMBLY PROVIDING A STORED INDICATION OF THE PASSAGE OF THE ASSEMBLY OVER A MAGNET CONCEALED IN A GAME BOARD

Robert L. Brass, Westport, Conn.; Arthur P. Venditti, Peabody, and Samuel T. Kjellman, Framingham, both of Mass., assignors to Robert L. Brass, Westport, Conn.

Filed Nov. 24, 1975, Ser. No. 634,608
Int. Cl.² A63F *3/00*
U.S. Cl. 273—130 A **12 Claims**



1. A detector assembly arranged to be used in a game for indicating passage of the assembly over a magnet concealed in a game board, comprising:

a pivotable indicator having two stable positions;

means for selectively concealing the indicator; and

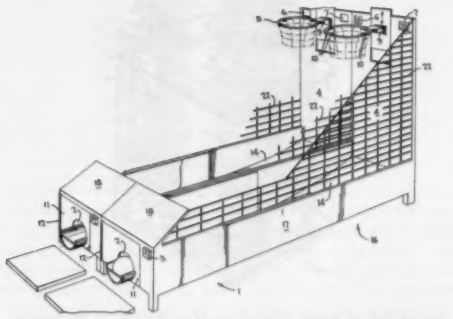
magnetic means in the indicator for pivoting the indicator from one stable position to the other stable position as the indicator passes over a concealed magnet and encounters its magnetic field;

the indicator remaining in the second stable position after once passing over a concealed magnet to provide a lasting indication thereof.

4,013,292
AUTOMATIC BASKETBALL GAME HAVING SCORING INDICATOR AND TIME LIMITATION

Monroe Cohen, Brooklyn, and Gale Dorothea, Queens, both of N.Y., assignors to Shoot The Hoops, Inc., Brooklyn, N.Y.

Continuation-in-part of Ser. No. 437,149, Jan. 28, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,876
Int. Cl.² A63B *67/00*
U.S. Cl. 273—102.2 R **8 Claims**



1. For use with a game wherein balls are dispensed to a player who attempts to win the game by throwing a certain number of balls into a target area, a control system comprising:

a. a token-operated switch for producing a start pulse upon insertion of a token;

b. a countdown clock for producing a time over signal at the end of a fixed time period, said clock comprising;

i. a multistage counter for providing a signal at a predetermined count,

ii. a pulse source for applying a stream of pulses to said multistage counter, and

iii. a clock control circuit having a first input, a second input from said multistage counter and a third input, said circuit being adapted to enable said pulse source in response to a signal on said first input and to disable said pulse source in response to a signal on said second input or a signal on said third input, whichever is first to occur;

c. a thrown-ball sensing subsystem for counting the number of balls actually thrown by the player to generate a third signal to be applied to said clock control circuit when a predetermined number of balls have been counted;

d. a score subsystem for registering the number of balls entering the target area, said score subsystem including an output terminal for carrying a win-indicating output signal;

e. a logic gate connected to said output terminal and to said thrown-ball sensing subsystem and responsive to a win-indicating output signal or to a predetermined thrown-ball count, whichever is first to occur, to inhibit any further registration of balls entering the target area; and

f. a game sequence subsystem connected to said thrown-ball sensing subsystem and to said countdown clock, said subsystem being responsive to a predetermined thrown-ball count or to the time-over signal, whichever is first to occur, to reset the game, said game sequence subsystem further including;

i. start logic connected to said token-operated switch and responsive to a start pulse to reset said ball sensing subsystem, and

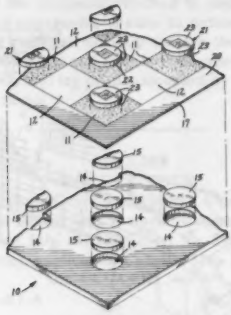
ii. game sequence logic connected to said countdown clock and responsive to a start pulse to generate the pulse source enabling first signal at the end of a time delay period sufficient to permit delivery of the balls to the player.

4,013,293

MAGNETIC GAME APPARATUS

Richard E. Hess, Brooklyn Park; Ronald A. Steinbrecher, Fridley, and Stephen A. A. Goddard, Minneapolis, all of Minn., assignors to H & S Enterprises, Inc., Anoka, Minn.

Filed Nov. 6, 1975, Ser. No. 629,656
Int. Cl.² A63F 3/02
U.S. Cl. 273—131 AD **3 Claims**



1. In a game, in combination:

a game board having a thin non-magnetic surface and comprising a uniform array of squares of two visually distinct characteristics arranged in rows and columns, each of alternating characteristics, the squares of one characteristic being played squares and those of the other characteristic being spacing squares;

magnet positioned below the upper surfaces of said playing squares only with their magnetic axes generally perpendicular to the board, the upper poles of magnets in each row of squares being of like polarity and the upper poles of magnets in adjacent rows being of opposite polarity;

and a plurality of thin reversible flat playing pieces including flat magnets arranged with their magnetic axes generally perpendicular to the flat surfaces, so that each piece in a first orientation is magnetically attracted to certain of said playing squares and repelled by others, while in the reverse orientation of the piece the attraction and replusion by the squares is reversed;

the pole strengths of said magnets being such that when like poles in a playing piece and a playing square resting thereon are abutting, the resulting upward repulsion is greater than the force exerted by gravity on the piece.

4,013,294

PERSONALITY NEED HIERARCHY GAME

Ralph Smeda, Reston, Va., and Martha S. Swartz, Rochester, N.Y., assignors to The Singer Company, New York, N.Y.

Continuation of Ser. No. 535,269, Dec. 23, 1974, abandoned. This application May 4, 1976, Ser. No. 683,141
Int. Cl.² A63F 3/00
U.S. Cl. 273—134 B **7 Claims**

1. An amusement and educational game for creating an awareness of human personality needs comprising:

a gameboard having;

a plane figure outline thereon interiorly divided into a plurality of levels corresponding to a hierarchy of human personality needs;

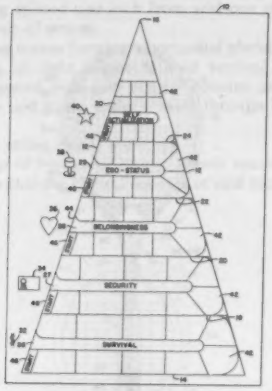
a plurality of continuous segments within at least some of the levels;

at least some of the segments at each level having intelligible matter thereon denoting a player's loss or gain of human personality needs associated with the level;

player moveable indicia for placing upon and traveling from segment to segment;

random number selector means to indicate the number of segments to be traversed by an indicia; and

a scoresheet for use with the game board divided into a plurality of columns corresponding to the hierarchy of human personality needs appearing on the gameboard;



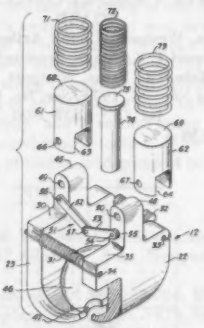
each of the columns enabling at least one player's human personality gains or losses to be recorded thereon.

4,013,295

GOLFER'S POSITIONING AND RETRIEVING DEVICE

George Washington Baughman, 106 Interlachen Ave., Winter Park, Fla. 32789

Filed Sept. 12, 1975, Ser. No. 612,935
Int. Cl.² A63B 57/00; A47F 13/06
U.S. Cl. 273—162 E **10 Claims**



1. A portable golf ball teeing and retrieving apparatus for use with a golf ball, tee and golf ball handle comprising

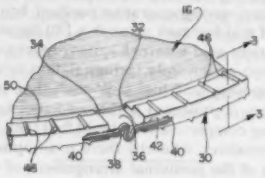
a pair of golf ball and tee gripping members, a resiliently biased latching means secured to said gripping members to hold said gripping members in either a golf ball and tee gripping position or a release position,

a gripping and position control means mechanically coupled to said members so that initial downward pressure on the gripping and position control means allows said ball and said tee to be positioned with said tee in the ground and said ball positioned thereupon; further downward pressure on said gripping and position control means causes said gripping members to release said ball and tee and additional downward pressure on said gripping and position control means in excess of said initial pressure causes said gripping members to assume a ball gripping position.

4,013,296
PHONOGRAPH RECORD STORAGE AND PROTECTION APPARATUS

Malcolm S. Keeney, 8727 Bay Pointe Drive, Tampa, Fla. 33615

Filed Dec. 8, 1975, Ser. No. 638,320
Int. Cl.² G11B 3/68
U.S. Cl. 274—42 R 8 Claims



1. A phonograph record accessory for protecting the opposite faces and rim of a disc type phonograph record during playing and storage of the record, the accessory comprising, a ring having an inner face including means for receiving the rim of the record and retaining the ring operatively mounted on the record, said ring further having opposite outer annular face means for engaging similar face means of adjacent rings and protecting the record faces from engagement with adjacent record and rings, said annular faces means being spaced outwardly in opposite directions from the receiving means, said ring further having opposite end portions and therebetween a gap, and means including a band spanning said gap and interconnecting said opposite end portions of said ring, said band being resilient for facilitating stretching of the band during placement of said ring on the record rim and for drawing said end portions toward each other and retaining said ring on the record, and said band being spaced outwardly from inner face of said ring and including means in the form of an open eye for increasing stretchability of the band and for receiving a suspension member extending through said eye, for suspending the record from a support.

4,013,297
STATIC SEAL WITH AN OPEN ROTATIONAL MODE

Robert L. Smith, Louisville, Ky., assignor to Chemetron Corporation, Chicago, Ill.

Filed Oct. 8, 1975, Ser. No. 620,682
Int. Cl.² F16J 15/48
U.S. Cl. 277—3 5 Claims

1. For a shaft journalled to rotate at intermittent times within a sleeve, a seal comprising:

a. a shaft, said shaft adapted to be connected to a motive source for intermittent rotation;

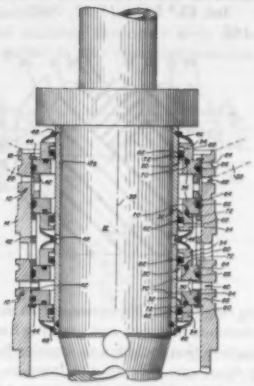
b. a sleeve surrounding said shaft, said sleeve having a radial opening therein adapted to be connected to a source of fluid pressure;

c. a first annular member surrounding said shaft and fixedly attached to said sleeve;

d. a second annular member surrounding said shaft, and mounted thereon for axial movement along said shaft, said second annular member and said first annular member overlapping each other to form an annular area of engagement therebetween and an area of nonengagement adjacent said shaft;

e. resilient sealing means located between said area of engagement;

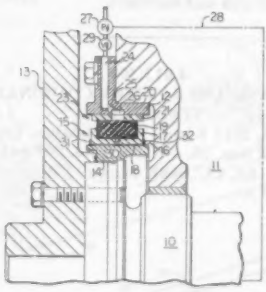
f. means located on the side of said second member opposite said sleeve opening for biasing said second member toward said first member to form a seal at said area of engagement when said shaft is not rotating and no fluid pressure is applied to said sleeve opening, and upon applying fluid pressure to said sleeve opening the pressure acting on said area of non-engagement to move said second member axially to open said area of sealing engagement to fluid flow therethrough prior to and during rotation of said shaft.



4,013,298
DYNAMIC AIR BEARING SEAL FOR ENGINE CRANKSHAFT

Roger O. Bjerk, Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 23, 1976, Ser. No. 660,535
Int. Cl.² F16J 9/00, 15/46
U.S. Cl. 277—75 10 Claims

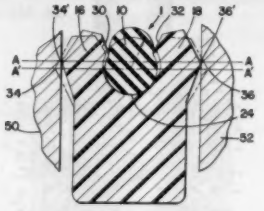


1. A pressurized sealing arrangement comprising a rotatable shaft, a generally ring-shaped inner bearing of rigid material about said shaft defining an interior bearing surface thereon proxmiate to and in spaced relation with said shaft, said housing having at least one opening therein on said interior bearing surface, said bearing further including a flexible boot mounting means in the form of a porous ring of material and a thin non-porous skin thereover fixed to said bearing for supporting said inner bearing in spaced relation to said shaft, said skin further serving to define a chamber coterminous with said ring, and means for supplying pressurized air to said thus defined chamber so that air flows from said chamber through said at least one opening to continuously prevent retrograde movement of contaminants.

4,013,299
SEALING RING

Lynn S. Scott, Salt Lake City, Utah, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Nov. 14, 1975, Ser. No. 631,856
Int. Cl.² F16J *15/32, 9/00*
U.S. Cl. 277—165 **4 Claims**

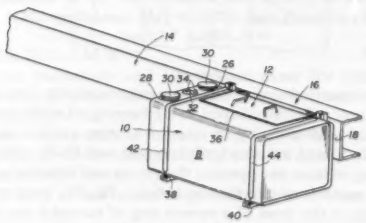


1. In a sealing ring for sealing between two members spaced apart a predetermined distance and said ring has a generally U shaped cross section that includes an annular base and spaced lips extending from one side of the base to form a cavity between the lips into which an elastomeric expander ring is mounted and each lip has a free end remote from the base, and wherein said lips between said base and free ends have upper and lower frusto-conical exterior surfaces that intersect to form a well defined annular sealing edge and which edges are laterally spaced from each other a distance greater than said predetermined distance, the improvement wherein when the seal is uninstalled a plane through both intersections is within a space extending from the center point of the cross section of the expander ring and the bottom of the cavity when the expander ring is bottomed in the cavity, the included angles of said frusto-conical surfaces are substantially equal and the upper frusto-conical surface on each lip intersects the respective free end so that the lateral end spacing between said last two intersections is substantially the same as the lateral cross section thickness of said base and whereby when the seal is installed said sealing edges are moved toward each other by engagement with said members and said lips are thereby rotated toward each other to deform said expander ring with no portion of the lips other than the sealing edges being in contact with said members.

4,013,300
FUEL TANK AND BATTERY COMBINATION STRUCTURE

Allan H. Berger, 2711 Kismet Lane, Houston, Tex. 77043

Filed Aug. 18, 1975, Ser. No. 605,641
Int. Cl.² B60K *15/00, 15/04*
U.S. Cl. 280—5 A **2 Claims**

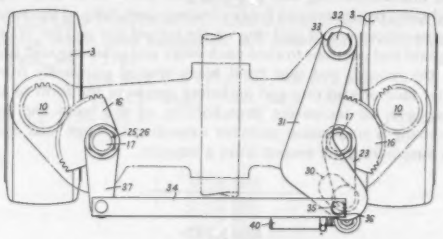


1. A fuel tank and battery combination mountable in select arrangements dictated by space requirements on a truck chassis having a vertically oriented support frame surface, said fuel tank comprising walls cooperating to circumscribe a generally rectangular volume, said walls being arranged relative to each other so as to bound within said volume an internal fuel storage compartment and also an external battery-receiving compartment opening into two adjacent side walls of said fuel tank, said fuel tank-battery arrangements comprising means mounting said battery to extend laterally of said supporting frame surface, and means to support said fuel tank from said supporting frame surface either in adjacent position to said battery with said external battery-receiving compartment thereof in an outwardly facing relation to said support surface or in a space-saving operative position in relation to said battery, said space-saving operative position being provided by movement of said fuel tank through a 180 degree rotational traverse to reorient said external battery-receiving compartment thereon into an inwardly facing relation to said support surface and disposing said fuel tank such that said laterally extending battery is projected within said fuel tank external battery-receiving compartment and said fuel tank is in enclosing relation thereabout, whereby there is an option available in the selection of the positional arrangement of said battery and fuel tank according to the available mounting space for same.

4,013,301
VEHICLE STEERING MECHANISMS

Graham Edward Gaskin, Ipswich, England, assignor to Ransomes Sims & Jefferies Limited, Ipswich, England

Continuation-in-part of Ser. No. 400,544, Sept. 25, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,242
Claims priority, application United Kingdom, Jan. 14, 1975, 1599/75
Int. Cl.² B62D *3/02*
U.S. Cl. 280—95 R **10 Claims**



1. A vehicle steering mechanism for an industrial vehicle, comprising:

first and second ground engaging wheels;

an axle on which said ground engaging wheels are mounted;

first and second upright shafts respectively for said ground engaging wheels, the rotation of each shaft effecting rotation of the associated ground engaging wheel;

first and second track rod systems connected respectively with said shafts, each track rod system including an arm mounted on said axle and rotatable about an upright axis;

first and second complementary cooperating reduction drive elements of which the first element is rotatable about the same axis as the corresponding arm and upon rotational movement about said axis of that arm, whilst the second element is mounted upon the corresponding upright shaft to effect rotation of that shaft upon rotational movement of said arm about its axis, the rotation of said arms causing through the reduction drive elements an angular displacement of said wheels through a larger angle than the angle of movement of said arms;

means for rotating one of said arms of said first and second track rod systems to effect steering of said ground engaging wheels; a rigid and inextensible link member pivotally mounted on said axle about an upright pivot axis and coupled with said arm of said first track rod system; and

a track connecting rod having pivotal connections with said link member and with said arm of said second track rod

system, said pivotal connections being spaced apart substantially by the distance between the axis of said arms of said track rod systems, said link member being located adjacent to and in relation to said first track rod system that in the position in which said ground engaging wheels are parallel its pivot axis and pivotal connection with said track connecting rod are joined by a line substantially parallel to said wheels, whereby upon operation of said means for rotating one of said arms rotation of both said arms about their respective axes and a differential rotation of said upright shafts is effected and said ground engaging wheels are rotated differentially to an extent such that as said arms rotate from said position in which said wheels are parallel the instantaneous center of rotation about which both wheels turn moves along a turning center line parallel with and spaced from a line joining said shafts of said wheels.

4,013,302

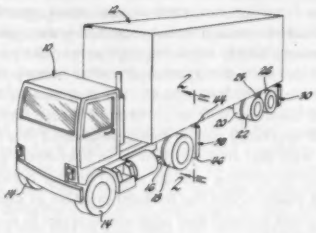
ACOUSTICALLY ABSORBENT TRUCK TIRE SPLASH GUARD

Lawrence J. Oswald, St. Clair Shores, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 14, 1975, Ser. No. 631,955

Int. Cl.² B62D *25/16*

U.S. Cl. 280—154.5 R **5 Claims**



1. In combination with a motor vehicle having a tire rolling on a road surface with the tire generating a whine noise over a range of frequencies and throwing particulate matter toward the tire, the combination comprising: a flexible panel mounted closely adjacent and rearward the tire for deflecting particulate matter thrown thereagainst by the rolling tire; a panel of open cell sound absorbing foam underlying the face panel for protection against the particulate matter and effective to absorb the higher whine noise frequencies generated by the tire; a plurality of Helmholtz resonators juxtaposed with the panel of open cell sound absorbing foam and being tuned to resonant frequencies varying over the range of whine noise frequencies generated by the tire for absorbing the whine noise; and a back panel juxtaposed with the volume resonators and having a high density effective as a barrier to those whine noise frequencies which are not absorbed by the panel of acoustical foam and the Helmholtz resonators.

4,013,303

FOLD-AWAY TOW BAR

William J. Milner, Pleasantville, Iowa 50225

Filed Aug. 27, 1975, Ser. No. 608,072

Int. Cl.² B60D *1/00*

U.S. Cl. 280—491 D **7 Claims**

1. A towing bar for permitting a towing vehicle to tow a towed vehicle, comprising,

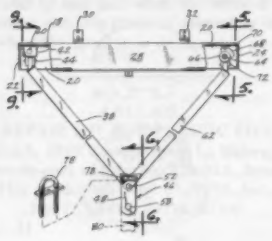
an elongated, horizontally disposed housing operatively secured to the forward end of the towed vehicle and having opposite ends and an interior compartment,

first and second tow bar members pivotally secured at one end thereof to said housing adjacent the opposite ends thereof,

said tow bar members having a length less than said housing to permit said tow bar members to be stored within said housing at times,

said tow bar members being pivotally movable from said stored position to an inwardly and forwardly extending operative position,

first means for securing the other ends of said tow bar members together in said operative position,



and means on the said other end of at least one of said tow bar members for connection to the towing vehicle,

one of said tow bars being vertically movable with respect to its pivotal connection to said housing to permit said one tow bar member to be stored on top of said other tow bar member in said housing.

4,013,304

SKI-BINDING WITH AN ADJUSTABLE TOE OR HEEL HOLD-DOWN LOOP

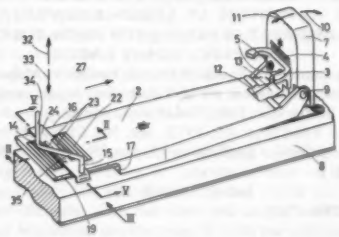
Jean-Marie Begey, Cluses, and Alain Neau, Thyez, both of France, assignors to Garcia Corporation, Teaneck, N.J.

Filed Jan. 28, 1976, Ser. No. 653,259

Claims priority, application France, Mar. 11, 1975, 75.07585

Int. Cl.² A63C *9/00*

U.S. Cl. 280—618 **13 Claims**



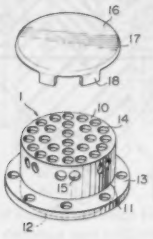
1. In a ski binding comprising a support and a boot-sole hold down loop assembly movably mounted along lateral guide profiles extending longitudinally along the support to accommodate for boots of different sizes and in which the support has a series of positioning notches for said assembly, the improvement wherein said assembly comprises a rigid loop having a central part shaped to fit over an end part of a boot sole and two integral end parts bent relative to the central part and terminating with profiles complementary to and fitting against said lateral guide profiles of the support, and a single clamping member movably mounted on the end parts of the loop and provided with means for clamping the loop to the support, one of said loop and said clamping member being provided with notches cooperating with said notches of the support to position the loop at a desired location.

4,013,305

BUFFERING AIR-BAG MEANS

Isao Ichihara, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 21, 1975, Ser. No. 569,934
Claims priority, application Japan, May 15, 1974, 49-54231
Int. Cl.² B60R *21/08*
U.S. Cl. 280—742 **2 Claims**



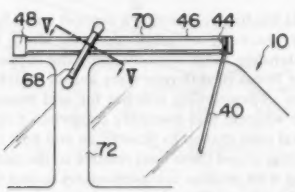
1. A bufferng air-bag means comprising a gas generating means having a completely hollow outer shell box which is mounted to the hub of a steering wheel, said outer shell box being formed of two substantially U-shaped cup members, the open ends of said cup members engaging with each other so that the open ends thereof close on each other to form a closed, substantially flat bottom wall, a cylindrical perforated sidewall and a perforated, substantially flat top wall, an air bag folded around said outer shell box and adapted to be inflated by gas generated by said gas generating means, and a deflecting plate spaced apart from said top wall of said outer shell box, said deflecting plate having a substantially flat, disc-shaped body which is provided with a plurality of leg portions spaced along the peripheral edge of said disc body, said leg portions being firmly connected to the upper peripheral edge portions of said cylindrical outer shell box so as to hold the substantially flat disc-shaped body relative to said outer shell box in spaced-apart relationship.

4,013,306

VEHICLE OCCUPANT RESTRAINING BELT WITH DEVICE TO PROVIDE AN ARRANGEMENT IN WHICH SHOULDER BELT IS PREVENTED FROM TOUCHING SEATED OCCUPANT'S NECK

Yoshihisa Imabuchi; Kenshi Kurami; Yoshinori Akiyama, and Katsunobu Sobajima, all of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sept. 15, 1975, Ser. No. 613,419
Claims priority, application Japan, Sept. 18, 1974, 49-112416[U]
Int. Cl.² B60R *21/02*
U.S. Cl. 280—745 **1 Claim**



1. In a vehicle having a vehicle body including a floor and a roof defining an occupant compartment in which is mounted a vehicle seat accessible through a vehicle door opening selectively opened and closed by a vehicle body door whose front edge is pivotally secured to the vehicle body,

an occupant restraining belt arrangement comprising:

a lap belt having one end fixed adjacent a lower inboard portion of the seat;

a first inertia retractor mounted adjacent a lower inboard portion of the door and receiving the other end of said lap belt;

an apertured member slidably receiving an intermediate portion of said lap belt;

retractable means mounted on the vehicle body adjacent the outboard forward portion of the occupant compartment and above said apertured member in the lower rearward position;

an elongated flexible member having one end secured to said apertured member and the other end thereof received by said retractable means;

a shoulder belt having one end secured to an intermediate portion of said lap belt between said apertured member and the lower inboard portion of the seat;

a second inertia retractor mounted on the roof within the occupant compartment adjacent an outboard upper rear portion of the seat;

a track member mounted on an outboard portion of the roof in a generally longitudinally extending direction within the occupant compartment;

an apertured carrier mounted at said track member for longitudinal movement with respect thereto, said apertured carrier slidably receiving an intermediate portion of said shoulder belt, said apertured carrier being positioned in a rearward position adjacent the rear end of the seat with said shoulder belt in an occupant restraining position, said apertured carrier being positioned in a forward position with said shoulder belt in an easy-enter position;

drive means for moving said apertured carrier between the rearward position and the forward position as said shoulder belt slides through said apertured carrier to move said shoulder belt between the occupant restraining position and the easy-enter position;

control means for actuating said retractable means to retract said flexible member and for actuating said drive means during opening movement of the door to move said apertured member longitudinally of the vehicle body from the rearward position to an upper forward position moving said lap belt from an occupant restraining position to an easy-enter position as said first inertia retractor allows protracting movement of said lap belt and to move said apertured carrier to the forward position moving said shoulder belt to its easy-enter position as said second inertia retractor allows protracting movement of said shoulder belt, said control means actuating said retractable means to allow protraction of said flexible member from said retractable means as said first inertia retractor retracts said lap belt and for actuating said drive means during door closing movement of the door to permit said apertured member to move from the upper forward position to the lower rearward position moving said lap belt to its occupant restraining position and to move said apertured carrier to the rearward position moving said shoulder belt to its occupant restraining position as said second inertia retractor retracts said shoulder belt; and

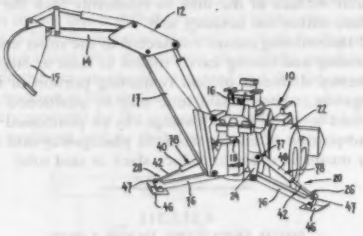
a channel member mounted to the roof within the occupant compartment, straddling said track member, said channel member slidably receiving an intermediate portion of said shoulder belt, to provide an arrangement in which said shoulder belt extends diagonally across the chest of a seated occupant without touching the neck thereof when said shoulder belt is in its occupant restraining position.

4,013,307

DUAL POSITION STABILIZER

Allyn C. Dowd, Sterling Heights, and John D. Rogowski, Bloomfield Hills, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Sept. 22, 1975, Ser. No. 615,445
Int. Cl.² B60S 9/02
U.S. Cl. 280—764 11 Claims



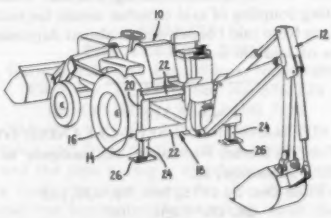
1. Stabilizing apparatus for a vehicle supporting load handling equipment comprising a frame work having an elongated Cavity rigidly attached to each side of the vehicle; ground engageable support means, a strut member supporting said ground engageable support means relative to said vehicle, a shaft supporting said strut for pivotal movement about a horizontal axis for swinging movement of said ground engageable support means between a transport position and a ground engaged position, a bearing received in said cavity journaling one end of said shaft to said frame work, bracket means holding said bearing in a selected one of two positions in said cavity in which said shaft is displaced angularly and horizontally about its other end relative to said vehicle, including a bracket member, a plate and a bearing engaging pad on said, means detachably securing said plate to said plate, said plate covering one end of said shaft and said bearing in the attached position, said bearing engaging pad projecting from said plate toward said bearing to provide support on one side of said bearing with said plate in one position and on the other side of said bearing when said plate is rotated a half turn generally about the axis defined by said shaft for positioning said ground engageable support means in selected positions displaced longitudinally of said vehicle.

4,013,308

ADJUSTABLE STABILIZER

David S. Paul, Mississauga, Canada, assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Apr. 14, 1975, Ser. No. 568,080
Int. Cl.² B60S 9/12
U.S. Cl. 280—766 11 Claims



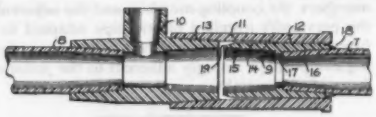
1. Stabilizer apparatus for a vehicle supporting load handling equipment comprising: a ground engaging foot member in the form of a generally flat pad, a support and support means movable relative to said support and between an elevated transport position and a lower operating position relative to said vehicles, means connecting said foot member to said support means for moving said foot member from a ground engaging position in which said pad is disposed generally horizontally to occupy a maximum horizontal width to an elevated transport position in which said pad is disposed to occupy a minimum horizontal width including an elongated link having opposite ends pivoted to said foot member and to said support means, respectively, and in which said link is disposed parallel to said pad when the latter is in its ground engaging position and in a position depending from said support means when the latter is in its elevated position.

4,013,309

REPAIR KIT FOR PLASTIC PIPE

William H. Quick, 1818 Kanola Road, La Habra, Calif. 90631

Continuation-in-part of Ser. No. 370,013, June 14, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,406
Int. Cl.² F16L 13/10, 47/00
U.S. Cl. 285—31 14 Claims



1. A nonmetallic plastic pipe coupling kit for coupling together by means of suitable cement, adjacent aligned ends of previously installed plastic pipe without need for axially displacing the installed pipe, said coupling kit comprising: first and second smooth-surfaced tubular plastic end members, each having a pipe-joining end adapted to have a first and second telescopic interference fit to the exterior of a respective one of the adjacent ends of said installed plastic pipe,

said first and second interference fits being produced by tapers on the inner diameters of said end members, which inner diameters taper from diameters at the pipe-joining ends, which are slightly larger than the outer diameters of said adjacent pipe ends, to diameters, inward from the pipe-joining ends, which are slightly smaller than the diameters of said adjacent pipe ends, said first and second interference fits requiring slight deformation of the joining parts upon assembly,

said end members having also respective regions, beyond said tapered inner diameters wherein the inner diameter is substantially smaller than the outer diameter of said adjacent pipe ends, said regions being designed to serve as stops upon assembly of said end members to said adjacent pipe ends,

a third smooth-surfaced relatively long tubular plastic coupling member having an interior surface of revolution from end-to-end thereof, one end of which has a smaller inner diameter than the other end and is sized to have a third telescopic interference fit with the exterior of said first end member,

said exterior of said first end member having an essentially cylindrical surface which is approximately uniform in diameter throughout substantially all of its length, so that said one end of the interior surface of said coupling member may produce said third interference fit with the exterior surface of said first end member at essentially any location along the length of the exterior surface of said first end member, said third interference fit requiring slight deformation of the joining parts upon assembly,

the remaining interior surface at said other end of said coupling member being of larger diameter than said one end portion and sized along said other end portion to have a fourth interference fit with the exterior surface of the nearest end portion of said second end member,

said fourth interference fit being produced by a taper on the inner diameters of said remaining interior surface, which

inner diameters taper from a diameter at said other end which is slightly larger than the outer diameter of said exterior surface of said second end member, to a diameter, inward from said other end, which is slightly smaller than the diameter of said exterior surface of said second end member, said fourth interference fit requiring slight deformation of the joining parts upon assembly,

whereby said other end of said coupling member is adapted to slide loosely over said first end member and subsequently engage with an interference fit said second end member,

whereby said coupling kit is adapted to produce a fluid-tight joint between said adjacent ends of said previously installed pipe, wherein the distance between said adjacent pipe ends may be such that said first and second end members, after they have been joined to said adjacent pipe ends, may be relatively close to each other, or may be spaced apart axially by a finite distance, thus allowing for ample tolerance of the coupling to variation in the initial spacing between said adjacent ends of said previously installed pipe,

the four joinable contacting surfaces between the two end members, the coupling member, and the adjacent ends of the previously installed plastic pipe adapted to be held firmly bonded together in a fluid-tight manner by a bonding composition strongly adherent to the juxtaposed surfaces of said members.

4,013,310

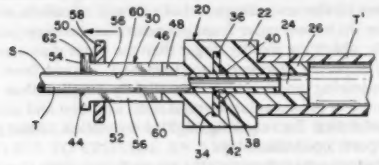
TUBING CONNECTOR

John F. Dye, Reedsburg, Wis., assignor to The Kendall Company, Boston, Mass.

Continuation of Ser. No. 594,379, July 9, 1975, abandoned. This application July 29, 1976, Ser. No. 709,742

Int. Cl.² F16L *17/02*

U.S. Cl. 285—110 **9 Claims**



1. A connection device, comprising:

a tube having a lumen and an outer surface;

a housing having a passageway to receive the tube, and a tubular portion adjacent one end of the housing defining an end of the passageway to receive the tube and having an outer surface tapering from a first smaller diameter to a second larger diameter adjacent an outer end edge of the tubular portion, with the remainder of said passageway having a larger internal diameter than the outside diameter of said tube;

an annular flexible sealing member having an opening of a size to receive and frictionally engage said outer surface of the tube, said sealing member being retained in the housing with the opening aligned with the passageway, whereby an end of the tube may be inserted into the passageway and through the sealing member opening with the sealing member engaging the outer surface of the tube;

means for retaining the tube in the housing with the tube extending through the sealing member comprising, a plurality of gripping members at the one end of the housing defined by a plurality of elongated slots extending from the end edge of the tubular portion and spaced peripherally around the tubular portion, and a ring slidably received on said tubular portion, with the inner diameter of the ring being greater than said first diameter and less than said second diameter, whereby said ring may be positioned at an inner portion of the tubular portion for inserting the tube into the housing with an inner surface of the gripping members spaced from the outer surface of the tube, and said ring may be moved toward the outer end of the gripping members to flex the gripping members toward the tube and frictionally engage the inner surface of the gripping members against the outer surface of the tube to releasably lock the tube in place within the housing; and

fluid transmitting means connected to the other end of the housing and having cavity means at least as large as the internal diameter of said remaining portion of the passageway, whereby said tube may be positioned at a selected location in the passageway or positioned with an end portion extending from the passageway into the cavity means in order to reduce slack in said tube.

4,013,311

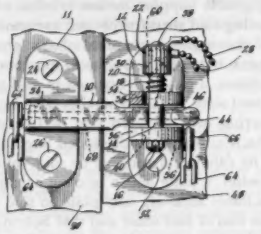
HIGH SECURITY DOOR LOCK

Richard L. Prezioso, 2050 Barnum Ave., Stratford, Conn. 06497

Filed Apr. 6, 1976, Ser. No. 674,225

Int. Cl.² E05C *5/02*

U.S. Cl. 292—59 **19 Claims**



1. A high security door lock comprising:

crossbar means adapted for mounting on a door;

keeper means adapted for mounting on a door frame;

pin means for mechanically coupling said crossbar means to said keeper means;

said pin means including projection means integrally formed therewith;

said keeper means including at least one slot for receiving said pin means and said projection means;

locking channel means integrally formed with said keeper means and oriented at an angle to said slot for receiving said projection means upon insertion of said projection means through said slot and rotation of said pin means; and

biasing means coacting with said pin means for holding said projection means in said locking channel means and preventing coupling of said crossbar means for said crossbar means from said keeper means absent depression and rotation of said pin means.

4,013,312

LATCH MECHANISM FOR SELF-CLEANING OVEN

Raymond Paul DeWeese, Kankakee, Ill., assignor to Roper Corporation, Kankakee, Ill.

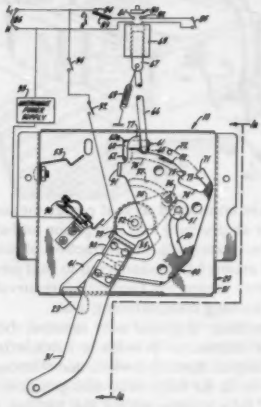
Filed Dec. 5, 1975, Ser. No. 638,185

Int. Cl.² E05C *5/00*

U.S. Cl. 292—113 **8 Claims**

1. In a door latch assembly for a pyrolytic self-cleaning oven or the like for cooperating with a striker on the oven door, the combination comprising a mounting plate having means for securing to the oven frame, a locking plate movable thereon, a hook-type bolt coupled to the locking plate for movement

therewith, an operating handle coupled to the locking plate for bodily moving the locking plate and its bolt between free and bolting positions, means fixed to the mounting plate defining a short slot adjacent the locking plate and oriented in the direction of movement of the adjacent portion of the locking plate, the slot having a shallow "idle" notch and deep "locking" notch spaced parallel to one another at right angles to the slot, a locking finger shiftable endwise in the slot and biased toward the notches, an actuator coupled to the locking finger so arranged that when the actuator is energized the locking finger is drawn into a shiftable position in the slot clear of the notches, a first abutment on the locking plate having a path of movement alined with the slot but clear of the notches so that (a) when the actuator is de-energized and the finger occupies an idle position in the shallow notch the locking plate and bolt are freely movable by the operating handle between free and bolting positions and so that (b) when the actuator is ener-



gized the finger is drawn into the slot in the path of movement of the first abutment with the result that, as the locking plate is moved fully into bolting position, the first abutment moves the finger to a position opposite the deep notch, a second abutment on the locking plate faced oppositely to the first abutment and having a path of movement alined with the root of the deep notch so that when the actuator is de-energized the finger drops by reason of the force of bias into the deep notch blocking the locking plate, and thus the bolt, in bolting position until such time as the actuator may be re-energized, and a third abutment on the locking plate having a path of movement aline with the slot and faced in the same direction as the second abutment and spaced from the latter so that, as the locking plate is subsequently returned to its free position, the third abutment shifts the finger into a position opposite the shallow notch, thereby premitting the finger to drop back into idle position when the actuator is thereafter de-energized.

4,013,313

PIPE TURNING TOOL

John H. Gardels, P.O. Box 128, Wilcox, Nebr. 68982

Filed Apr. 12, 1976, Ser. No. 676,228

Int. Cl.² B25B *13/50;* **B65G** *7/00*

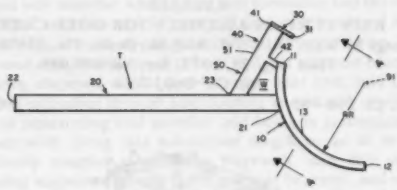
U.S. Cl. 294—17 **5 Claims**

1. Turning tool for irrigation pipe lying upon the earth's surface and the pipe having a circular cross-sectional shape including openable gates along the pipe longitudinal length and at least one longitudinally extending radial discontinuity at the pipe outer side such as a latch-recess, said pipe turning tool comprising:

A. An arcuate shoulder for abutment against the pipe outer side remote of the pipe radial discontinuity, said shoulder being spaced a substantially constant distance from a focal-point, said shoulder having two endward terminii including an upper-end and a lower-end and also a geometric mid-point between said terminii, the two end-ward terminii and the focal-point defining an angle within the range of 60° to 135°;

B. An elongate handle having a fore-end and a rear-end for manual control by the operator, the handle and the shoulder being substantially co-planar with the handle fore-end being rigidly attached to the shoulder whereby the handle rear-end is rearwardly remote from the shoulder, the handle fore-end being located remote from the shoulder mid-point whereby the shoulder arcuate length from one terminus to the handle fore-end bears a ratio of substantially two as compared to the remaining shoulder length;

C. A header rigidly attached to the shoulder and upwardly offset of the shoulder upper-end;



D. A detent extending rigidly downwardly from the header and having a lower free-end located a fixed-distance across a spatial gap from the shoulder upper-end, said detent lower free-end being adapted to engage with the pipe radial discontinuity whereby operator initiated movement of the handle rear-end causes controlled turning of the irrigation pipe about its central-axis;

and

E. A brace member extending rigidly upwardly and forwardly of the handle from a bracing-station located nearer to the handle fore-end than to the rear-end, said brace member being rigidly attached to the header and also to the shoulder at a buttress-locale whereby the bracing-station, the buttress-locale, and the handle fore-end collectively define the three points of a structurally rigid triangle.

4,013,314

LIFTING HOOKS

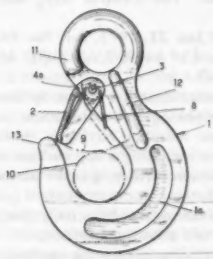
Jean-Francois Archer, 10 Avenue Georges-Clemenceau, 78670 Villennes, France

Filed Mar. 27, 1975, Ser. No. 562,856

Claims priority, application France, Mar. 29, 1974, 74.11174; Mar. 17, 1975, 75.08824

Int. Cl.² B66C *1/36*

U.S. Cl. 294—82 R **9 Claims**



7. In a lifting hook comprising a generally J-shaped body with a longer leg and a shorter leg defining a mouth therebetween, an eye at the top of said longer leg, and a catch pivoted

at a fulcrum near said eye to said longer leg for swinging within said mouth between a retracted position alongside said longer leg and an operative position athwart said mouth, said catch being provided with spring means biasing same into said operative position, said legs being interconnected by a bight portion for the support of a load-lifting member introduced into said mouth,

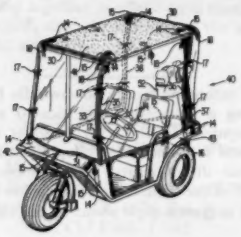
the improvement wherein said shorter leg progressively widens from said bight portion to its free end, said body having an annular portion surrounding said eye and broadening above said mouth into a pair of lateral projections overhanging said catch in said operative position thereof, the width of said body at said projections substantially equaling the maximum width of said shorter leg at said tip.

4,013,315

RAIN CURTAIN ASSEMBLY FOR GOLF CARTS

George L. West, 1619 NW. 35th St., Ocala, Fla. 32670

Filed Aug. 29, 1975, Ser. No. 609,089
Int. Cl.² B60J *7/24*
U.S. Cl. 296—83 **5 Claims**



1. A rain curtain assembly for a golf cart, having a passenger compartment with a top overlying said passenger compartment, comprising: a front panel, a rear panel and a pair of side panels, each of said front, rear and side panels having at least one suction cup connected by elastic means to the upper edge thereof and at least one suction cup connected by elastic means to the lower edge of each of said front and rear panels, a hook member connected by elastic means to the center portion of the lower edge of each of said front and rear panels, said suction cups and hook members providing releasable engagement with said golf cart, each of said front and rear panels having at least one tie cord on each side edge thereof, and each of said side panels having at least one tie cord on each side edge thereof for releasable tying engagement with a tie cord of one of said front or rear panels.

4,013,316

MECHANICAL STOOL FOR HANDICAPPED PERSONS

Winifred Cropper, 100 Central Ave., Rochelle Park, N.J. 07662

Filed Jan. 21, 1975, Ser. No. 542,825
Int. Cl.² A47K *3/12*; A47C *15/00*
U.S. Cl. 297—347 **1 Claim**

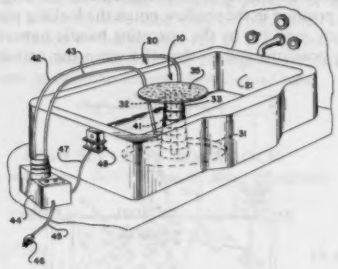
1. A portable stool intended for use by handicapped persons and the like, comprising, in combination:

a non-slip base member having a substantially flat disc configuration including a top surface and a bottom surface, said bottom surface of said base member removably engaging a bathing compartment;

a seat member having a substantially disc shape including a top surface and a bottom surface;

a telescopic support mast having one end affixed to said top surface of said base member with the opposite end of said telescopic support mast affixed to said bottom surface of said seat member with said seat member disposed vertically above and concentric with said base member, said telescopic support mast comprising a series of concentrically disposed different diameter hollow collar members of cylindrical configuration, said collar members being nested within each other when said seat member is disposed adjacent said base member which corresponds to said mast being in a maximum retracted position, said collar members being telescoped outwardly to place said seat member spaced furthest away from said base member when said mast is in a maximum extended position;

power means disposed inwardly of said support mast comprising an air operated piston and cylinder member with said piston being affixed to said seat member and with said cylinder being affixed to said base member;



control means connected to said power means for controlling power air pressure into said piston and cylinder member to effect extension and retraction of said mast;

said control means being connected to said power means by flexible hose means for facilitating removal of the stool from the bathing compartment; and

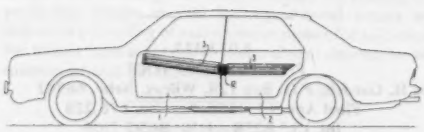
said base member and said seat member being cooperatively disc-shaped to provide a substantially flat disc-shaped compact structure when said telescoping supporting mast is in its fully retracted position enabling the bather to fully recline within the bathing compartment while the stool is disposed on the floor of the bathing compartment.

4,013,317

LATERAL PROTECTION FOR MOTOR VEHICLES

Willi Reidelbach, Sindelfingen; Herbert Grach, Munich; Hans Lütze, Aidlingen, and Dieter Weidemann, Weil der Stadt, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Continuation of Ser. No. 461,112, April 16, 1974, abandoned. This application Mar. 12, 1976, Ser. No. 666,419
Claims priority, application Germany, Apr. 16, 1973, 2319124
Int. Cl.² B62D *21/00*; B60J *5/04*
U.S. Cl. 296—146 **14 Claims**



1. In a protection device for a vehicle of the type including side doors, relatively fixed structural parts of said vehicle for defining the side door openings, and reinforcement means for absorbing lateral impact forces on said vehicle, said reinforcement means extending in the longitudinal direction of said vehicle inside said doors, the improvement comprising structural force transmission means at each end of said reinforcement means for directly transmitting longitudinal impact forces on said vehicle between said reinforcement means and relatively fixed structural parts such that said longitudinal

impact forces on said vehicle are directed uninterruptingly in said longitudinal direction by said structural force transmission means and said reinforcement means, and

wherein said structural force transmission means includes at least one of a profiled hollow structural member arranged between one end of said reinforcement means and said relatively fixed structural parts of said vehicle and a structural bar interposed between aligned facing ends of two longitudinally disposed reinforcement means of two respective longitudinally disposed side doors arranged at least at one side of said vehicle.

4,013,318

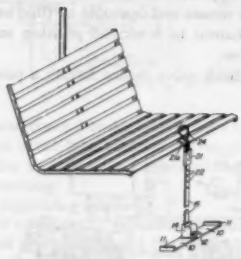
PORTABLE FOOTREST

James G. Piper, P.O. Box 103, Park City, Utah 84060

Filed Feb. 25, 1976, Ser. No. 658,347

Int. Cl.² A47C *7/50*

U.S. Cl. 297—438 **10 Claims**



1. A portable footrest adapted to be used with a chair in which the user of the footrest is sitting, comprising an integral foot support member, said foot support member comprising two pieces having mutually adjacent ends pivotally connected together as a unit so that the two pieces are movable about their interconnected mutual ends from a closed position in which they are folded upon each other in essentially parallel, side-by-side relationship to an open, operable position in which they extend outwardly in opposite directions from their interconnected mutual ends; a flexible suspension member; means for attaching one end of said suspension member to said foot support member at a point intermediate its ends so that the two pieces thereof are suspended from their interconnected mutual ends; and means for attaching the other end of said suspension member to said chair.

4,013,319

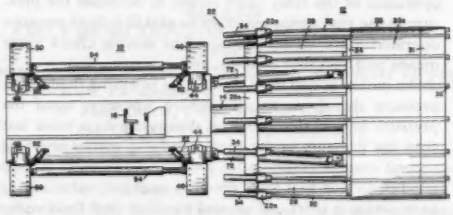
TUNNELING MACHINE WITH MASSIVE GUIDE FOR IMPACT TOOLS

Boyd A. Wise, Webster, N.Y., assignor to Hydroacoustics Inc., Rochester, N.Y.

Filed Mar. 20, 1975, Ser. No. 560,271

Int. Cl.² E21D *9/08*

U.S. Cl. 299—31 **32 Claims**



1. Apparatus for cutting a kerf in an earth formation which comprises

an impact tool having an actuator coupled to a drill steel which receives a bit at the end thereof, said bit delivering impact energy in the form of force pulses to said formation;

a carriage supporting said actuator and being movable in directions toward and across said formation;

a web member having a shape which outlines said kerf, said web member having a mass and stiffness substantially greater than the mass and stiffness of said drill steel, said web being supported by said carriage and movable therewith into and along said kerf, the thickness of said web member being less than the width of the cross section of said bit in the direction across said kerf, said web member extending longitudinally from said carriage a substantial length along said drill steel up to a location immediately behind said bit, said web member having an opening extending completely therethrough from the front end of said web member which faces said formation and the rear end of said web which faces said actuator, front and rear bearings in said opening, said front bearing being disposed at said web member front end and said rear bearing being disposed at said web member rear end, said drill steel extending through said opening in said web member and penetrating said member and being in juxtaposition therewith along said substantial length so as to be in closely coupled relationship therewith, said drill steel being supported in said front and rear bearings, and said web member supporting and guiding said drill steel into and along said kerf.

4,013,320

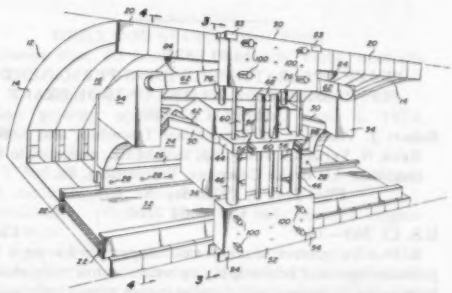
HOOK PLOUGH APPARATUS FOR LONGWALL MINING

Robert W. Johns, Calgary, Canada, assignor to World Oil Mining Ltd., Calgary, Canada

Continuation-in-part of Ser. No. 509,489, Sept. 26, 1974, Pat. No. 3,958,830. This application Oct. 31, 1975, Ser. No. 627,763

Int. Cl.² E21C *27/35*; **E21D** *15/02*

U.S. Cl. 299—33 **21 Claims**



1. A hook plow apparatus for use in longwall mining in conjunction with a mining shield having rails therein running along the length of the shield, said apparatus comprising:

a. a power transmission frame mounted for movement along said rails,

b. a plow mounting body connected to said frame,

c. upper and lower ranging plow blocks mounted on said plow mounting body,

d. means for propelling said frame, said body, and said ranging plow blocks simultaneously along said rails,

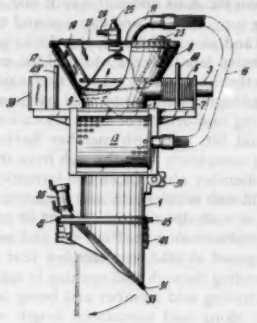
e. means for extending said mounting body and said ranging plow blocks toward the mine wall relative to said frame, and

f. means for vertically extending said ranging plow blocks relative to said mounting body.

4,013,321
PNEUMATICALLY ACTUATED HOPPER-FEEDER APPARATUS

Frank P. Pendleton, Montclair, N.J., assignor to VAC-U-MAX, Belleville, N.J.

Filed Nov. 21, 1974, Ser. No. 525,768
Int. Cl.² B65G 53/60
U.S. Cl. 302—59 5 Claims



1. A pneumatically actuated hopper comprising a substantially straight-walled, vertical, cylindrical main body portion provided with an outwardly flared upper portion having an inverted frusto-conical configuration, a top cover having an inlet connectable with a source of vacuum, a filter beneath said inlet generally conforming to the interior configuration of said upper portion, located within said frustoconical portion, and separated therefrom by supporting means, a materials inlet beneath said filter screen leading into said hopper near the junction of said tubular body and said flared top portion, a baffle extending from said inlet within said hopper to direct materials downwardly into said tubular body, and a closure valve extending across the entire diameter of the lower discharge end of said tubular body and operable upon demand to open and expose the said entire discharge of end to discharge of the material contained in said hopper.

4,013,322
BRAKE APPARATUS PROVIDING PERMANENT SUPPRESSION OF A TRAIN CONTROL BRAKE APPLICATION

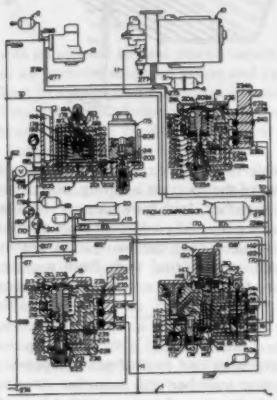
Robert J. Worbois, N. Huntingdon Township, and John R. Reiss, N. Versailles Township, both of Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 8, 1976, Ser. No. 693,744
Int. Cl.² B60T 7/16
U.S. Cl. 303—18 9 Claims

1. In a locomotive brake control apparatus having a fluid pressure operated brake applying means, a normally charged brake pipe, a brake control valve means operatively responsive to a decrease in the pressure in the brake pipe to cause the supply of fluid under pressure to the brake applying means and to an increase in the pressure in the brake pipe to cause the release of fluid under pressure from the brake applying means, a main reservoir, an equalizing reservoir, a stop reservoir, a manually operative engineer's brake valve device having a self-lapping control valve means for controlling the pressure in the equalizing reservoir, a self-lapping relay valve means operative by variations of pressure in the equalizing reservoir to correspondingly control the pressure in the brake pipe, a fluid pressure operated brake application valve device having a normal position in which it establishes a charging communication via which the equalizing reservoir is charged by the self-lapping control valve means to cause operation of the relay valve means to supply fluid under pressure to the brake pipe to increase the pressure therein to effect a release of the brakes and movable therefrom to an application position in which it cuts off the supply of fluid under pressure from the self-lapping control valve means to the equalizing reservoir and establishes a venting communication via which the equalizing reservoir is vented to atmosphere to cause operation of the relay valve means to release fluid under pressure from the brake pipe to decrease the pressure therein to effect an application of the brakes and an electro-responsive valve means operative automatically in response to a change in a track signal indication to a more restrictive indication to release fluid under pressure from the fluid pressure operated brake application valve device to the stop reservoir to effect movement of this valve device from its normal position to its application position, wherein the improvement comprises:

a. a first fluid pressure operated valve means interposed between the brake application valve device and the electro-responsive valve means, this first valve means having a first position in which fluid under pressure may flow from the brake application valve device to the electro-responsive valve means and operable by fluid under pressure supplied thereto to a second position in which it prevents said flow,

b. a first double check valve device having a pair of inlets and an outlet,



c. a first conduit connecting said outlet to said first fluid pressure operated valve means,

d. a second conduit connecting the fluid pressure operated brake applying means to one of said pair of inlets through which fluid under pressure supplied to the brake applying means may flow to said first fluid pressure operated valve means via said first double check valve device and said first conduit,

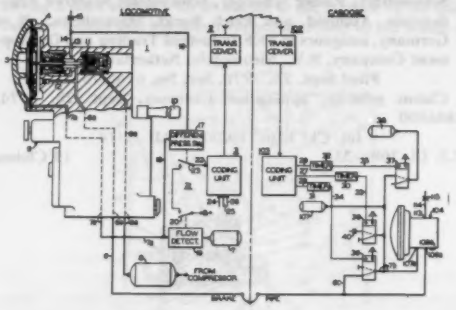
e. a third conduit connecting the self-lapping relay valve means to the other of said pair of inlets through which fluid under pressure released from the brake pipe by operation of the relay valve means to decrease the pressure in the brake pipe may flow to said first fluid pressure operated valve means via said first double check valve means and said first conduit, and

f. choke means in said third conduit for releasing fluid under pressure therefrom to atmosphere whereby, upon the pressure in said third conduit decreasing to a valve less than the pressure in the brake applying means and said second conduit, fluid under pressure flows from second conduit to said first fluid pressure operated valve means to maintain it in its said second position until fluid under pressure is released from said brake applying means by operation of the brake control means in response to an increase in the pressure in the brake pipe.

4,013,323
REMOTE CONTROL BRAKE SYSTEM FOR A RAILWAY TRAIN

Richard O. Burkett, Apollo, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 9, 1976, Ser. No. 694,143
Int. Cl.² B60T *13/68*
U.S. Cl. 303—20 **13 Claims**



1. A remote control brake system for a railway train having a continuous brake pipe extending through the train in which fluid pressure is varied for control of the train brakes, said system comprising:

a. a first equalizing reservoir;

b. a brake valve device to which said first equalizing reservoir and one end of said brake pipe is connected, said brake valve device being operable to effect variation of fluid pressure in said first equalizing reservoir, in response to which said brake valve device is operable to effect a corresponding variation of fluid pressure in said brake pipe;

c. means for signalling a brake command in accordance with operation of said brake valve device;

d. means for transmitting said brake command signal;

e. means for receiving said transmitted brake command signal at a location along the train remote from said transmitting means; wherein the improvement comprises:

f. a second equalizing reservoir connected to said brake pipe at said remote location, said second equalizing reservoir being charged to the pressure of said brake pipe at said remote location;

g. control means for cutting off charging of said second equalizing reservoir and concurrently effecting venting of fluid pressure therefrom in accordance with said brake command signal being indicative of a brake application; and

h. valve means for venting fluid pressure from said brake pipe at said remote location in response to a perponderance of fluid pressure in said second equalizing reservoir relative to the fluid pressure of said brake pipe at said remote location.

4,013,324
FAULT DETECTION FOR WHEEL SLIP CONTROL SYSTEM

Donald S. Quon, St. Louis, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Oct. 6, 1975, Ser. No. 620,206
Int. Cl.² B60T *8/00, 8/02, 8/08, 8/10*
U.S. Cl. 303—92 **24 Claims**

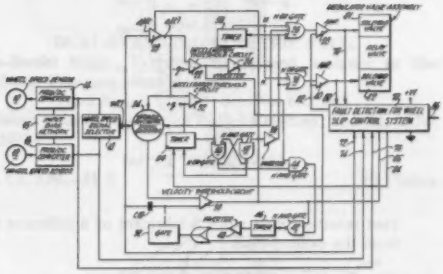
1. In a wheel slip control system having electric solenoids therein which are energized by an electric pulse in response to a logic circuit, and further having at least two point-type speed sensors which generate electrical signals having amplitudes proportional to wheel speeds, the invention of a fault detection system comprising:

a. a first cyclic timing means operable in response to at least a first wheel slip control system signal to begin a timing cycle;

b. means for resetting said first cyclic timing means in response to at least a second wheel slip control system signal provided that said second wheel slip control system signal occurs before the end of the timing cycle of said first cyclic timing means;

c. means for generating a first wheel slip control system shutdown signal when said first cyclic timing means fails to be reset before the end of its timing cycle;

d. a second cyclic timing means operable in response to at least a third wheel slip control system signal to begin a timing cycle;



e. means for resetting said second cyclic timing means in response to said second wheel slip control system signal provided that said second wheel slip control system signal occurs before the end of the timing cycle of said cycle of said second cyclic timing means;

f. means for inhibiting the resetting of said second cyclic timing means in response to said second wheel slip control system signal having a predetermined characteristic; and

g. means for generating a second wheel slip control system shutdown signal when said second cyclic timing means fails to be reset before the end of its timing cycle.

4,013,325
DRILL ROD STABILIZING TOOL

Ian Graeme Rear, 53 Louise St., Nedlands, Perth, Australia (6000)

Filed Sept. 4, 1975, Ser. No. 610,219
Claims priority, application Australia, Sept. 4, 1974, 8759/74
Int. Cl.² F16C *1/26*
U.S. Cl. 308—4 A **13 Claims**

1. A stabilizing tool, comprising:

a substantially cylindrical body, said body having a longitudinal axis;

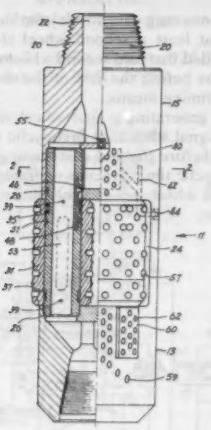
said body having a plurality of substantially cylindrical chambers formed therein said chambers being located axially within the body and spaced symmetrically around the body with respect to the longitudinal central axis thereof, wherein the diameter of the chambers is such that a portion of the wall extends beyond the perimeter of the body to provide axial rectangular openings in the side of the body;

each end of the body being provided with an axial fluid passageway which is divided to provide a fluid path through each chamber for the flow of drilling fluid through the stabilizing tool;

stabilizing rollers rotatably mounted upon a hollow shaft mounted in said chambers such that the circumference of rotation of the rollers extend through said rectangular openings beyond the body;

a lubricant reservoir provided in said body and vented to the fluid passageway for the application of fluid pressure to the lubricant in the reservoir; and

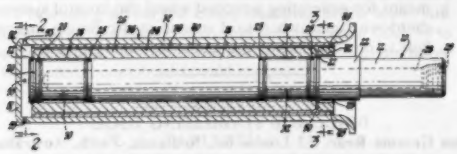
outlets in the reservoir communicating with the bearing surfaces between the rollers and shafts, wherein the lubricant reservoir is to store a lubricant of a different form from the drilling fluid.



4,013,326
GAS BEARING ROLL SHELL ASSEMBLY WITH PRELOAD MEANS

Donald J. King, Huron, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 2, 1976, Ser. No. 673,286
Int. Cl.² F16C *17/16*
U.S. Cl. 308—9 **2 Claims**



1. A preloaded gas bearing roll shell assembly comprising:

an axle having an enlarged diameter portion and supply passage means having an inlet adjacent a first axial end thereof adapted for connection to a source of gas under pressure,

internal chamber means in said enlarged diameter portion in fluid communication with said supply passage means for receiving gas under pressure therefrom,

and restrictive passage means through said enlarged diameter portion leading from said internal chamber means and onto an external circumferential surface thereof,

a rotatable roll shell surrounding said enlarged diameter portion with a small radial clearance whereby said roll shell is adapted to be radially supported on a layer of gas supplied from said internal chamber via said restrictive passage means,

said roll shell having an end wall adjacent an axial end thereof in juxtaposition to an axial end of said axle remote from said first axial end, and a thrust ring adjacent an opposite axial end therof in juxtaposition to an annular face of said enlarged diameter portion,

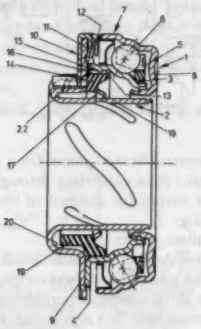
exhaust passage means leading from said radial clearance past said thrust ring to ambient,

axial preload means for maintaining said thrust ring in close proximity to said annular face comprising a pressure chamber in direct fluid communication with said radial clearance and defined at least in part by an end portion of said rotatable shell including said end wall, said end portion having vent means therethrough which is more flow restrictive than said exhaust passage means leading from said radial clearance past said thrust ring.

4,013,327
CLUTCH THRUST BEARING

Heinrich Kunkel; Armin Olschewski; Lothar Walter, all of Schweinfurt; Rainer Schurger, Schwanfeld; Manfred Brandenstein, Aschfeld, and Erich Burkl, Stammheim, all of Germany, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed Sept. 25, 1975, Ser. No. 616,575
Claims priority, application Germany, Sept. 28, 1974, 2446500
Int. Cl.² F16C *19/00;* **F16D** *23/14*
U.S. Cl. 308—233 **19 Claims**



1. In a self-centering clutch thrust bearing having a central axis and including inner and outer races, a plurality of rolling elements between said races, a sliding sleeve having at least a first annular part thereof situated radially inward of said inner race, said first annular part and said inner race having first and second facing surfaces, respectively, with an annular space defined therebetween, said sleeve being slightly movable radially relative to said inner race, thus defining radial play therebetween, and coupling means engaging and maintaining said sleeve and inner race in generally fixed axial relationship, the improvement in combination therewith comprising an elastic ring situated in said annular space on one of said first and second surfaces, the ring having resilient lugs extending toward the other of said surfaces for resiliently engaging the other of said surfaces during relative radial displacement therebetween, and thereby damping relative radial movement between said sleeve and inner race.

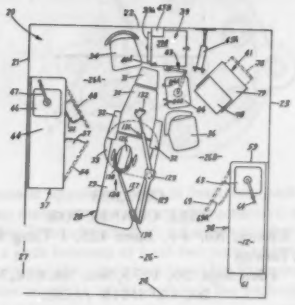
4,013,328
CABINET STRUCTURE FOR DENTAL TREATMENT ROOM

Hugo M. Wolf, 1451 NE. Glacier Lane, Minneapolis, Minn. 55421, and Leo H. Wolf, 2000 Idaho Ave. South, Minneapolis, Minn. 55426

Division of Ser. No. 292,478, April 3, 1972, Pat. No. 3,902,246. This application Mar. 14, 1975, Ser. No. 558,322
Int. Cl.² A47B *81/00;* **A61B** *19/02;* **A61C** *19/02;* **B01L** *9/02*
U.S. Cl. 312—209 **32 Claims**

1. Cabinet structures for use in a dental treatment room having a dental treatment chair having a head end and sides, the combination of a first cabinet means located adjacent the head end of the chair, second cabinet means located adjacent one side of the chair, third cabinet means located adjacent the opposite side of the chair, mobile cabinet means located between the first and third cabinet means adjacent said opposite side of the head of the chair, said second cabinet means having an upright door means located on the front of the second

cabinet means, means pivotally mounting the door means on the second cabinet means for movement about a generally upright axis to selective open and closed positions, generally horizontal shelf means mounted on the inside of the door means, a drawer located above said door means, and means movably mounting the drawer on the second cabinet means for selective generally horizontal movement to an out open position and to an in closed position, said third cabinet means having a door means with an access to the interior of the third cabinet means and container means attached to the inside of



the door means for storing objects moved through the opening, said mobile cabinet means having a pair of laterally spaced upright side panels, base means for carrying the side panels, a plurality of pull-out drawers movably mounted on the side panels adjacent the top of the base means, tray means movably mounted on the side panels above said drawers and coacting means on the tray means and side panels slidably mounting the tray means on the side panels for selective movement to a first out position in front of the mobile cabinet means and a second out position in back of the mobile cabinet means.

4,013,329

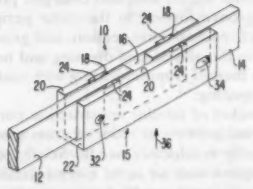
MULTIPLE PLATE ASSEMBLY FOR FORMING ELECTRICAL CONNECTOR OR SWITCH

Peter E. Hugin, Los Altos, Calif., assignor to Multilam Corporation, Los Altos, Calif.

Filed Feb. 23, 1976, Ser. No. 660,549

Int. Cl.² H01R *41/00*

U.S. Cl. 339—9 E **12 Claims**



1. An electrical connector assembly comprising: a first rigid electrical conductor means and a second rigid electrical conductor means spaced from said first conductor means; an electrical connector unit having a number of rigid, electrically conducting plates; means mounting the plates of said connector unit in an operative position with said plates being spaced apart and in bridging relationship to said first conductor means and said second conductor means to electrically interconnect said first conductor means and said second conductor means, at least one of the conductor means being movable relative to the plates of said connector unit when the latter is in said operative position to compensate for temperature cycling, each plate having a pair of opposed, outer faces with at least one face provided with a pair of spaced grooves therein aligned with a corresponding conductor means when the connector unit is in said operative position; and a louvered electrical connector device for each groove, respectively, each device being disposed within the corresponding groove and having a plurality of spaced, angled, resiliently mounted fins with each fin having a pair of opposed, outer curved edges in engagement with the adjacent plate and conductor means, respectively, when the connector unit is in said operative position whereby the first conductor means and the second conductor means are electrically connected to each other through the devices and said plates of said unit.

4,013,330

DUAL-STANDARD ELECTRIC PLUG

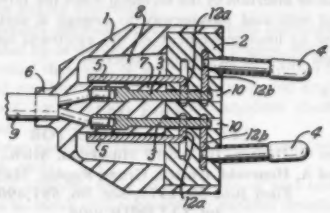
Jean-Daniel Hugly, Yverdon, Switzerland, assignor to The Gillette Company, Boston, Mass.

Filed Nov. 17, 1975, Ser. No. 632,283

Claims priority, application United Kingdom, Nov. 21, 1974, 50534/74

Int. Cl.² H01R *29/00*

U.S. Cl. 339—31 R **19 Claims**



1. A dual-standard electrical plug comprising:

an insulating hollow casing having an opening,

a terminal fitting within the casing, said fitting comprising a pair of conducting terminal pins extending towards the opening in the casing,

an insulating insert insertable with a sliding action into the opening in the casing, said insert having apertures for receiving the terminal pins when said insert is received in the opening of the casing, respective pairs of conducting socket pins projecting from opposite faces of the insert, the socket pins of the respective pairs being insulated from each other when the insert is out of the casing and being adapted to differing standards in respect of their dimensions and relative positions,

locking means for locking the insert in the casing with only one selected pin of each pair of socket pins projecting therefrom and the other socket pins accommodated in the casing, and

connection establishing means in said insert for cooperative coupling with the terminal pins for establishing a conductive connection between said selected socket pins and the terminal pins received in the terminal pin-receiving apertures in the insert only when the insert is inserted into the casing.

4,013,331

ELECTRICAL HOUSING MEMBER

Robert James Kobler, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

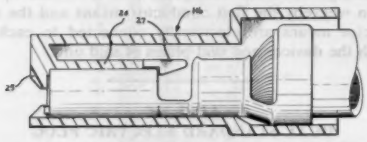
Division of Ser. No. 520,572, Nov. 4, 1974, Pat. No. 3,971,613, which is a continuation of Ser. No. 572,589, Aug. 15, 1966. This application Apr. 2, 1976, Ser. No. 672,929

Int. Cl.² H01R *13/48*

U.S. Cl. 339—59 R **2 Claims**

1. An electrical connector assembly comprising a unitary dielectric housing of hard springy material and an electrical

terminal, said housing having at least one passageway therein in which said electrical terminal is located, forward stop means formed integrally from said housing and extending partially across said passageway toward which one end of a contact section is directed to limit movement of the electrical terminal in one direction, at least one inner stop means formed integrally from said housing and extending along part of said passageway, said inner stop means directed toward the rear of said passageway and comprising a unitary stiffly-flexi-



ble member having cam means and latching means spaced apart therealong, said cam means adapted to be engaged by said terminal during insertion of said terminal in said passageway to move said latching means away from the path of insertion of said terminal to allow insertion of said terminal into said passageway and said latching means moving back toward the path of insertion of the terminal when the terminal is fully inserted into said passageway to engage a section of said terminal to limit movement of the electrical terminal in a direction opposite to the one direction.

4,013,332

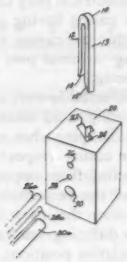
ELECTRICAL CONNECTOR

William C. Dauser, Jr., North Muskegon, Mich., assignor to Lloyd A. Heneveld, trustee, Grand Rapids, Mich.

Filed June 30, 1975, Ser. No. 591,490

Int. Cl.[2] H01R *9/08*

U.S. Cl. 339—98 **27 Claims**



1. An electrical connector assembly adapted to be electrically conductively connected to an elongated conductor comprising:

a conductor engaging connector means including a base with two elongated legs extending from said base and spaced from each other, said legs including at least two sides thereof intersecting to form cutting edges; said combined legs in transverse cross section being defined by an outline which is elongated in shape;

a base member having a positioning means for positioning a conductor to be oriented in a first predetermined direction and for resisting movement of the conductor when the conductor engaging connector means is forced adjacent the conductor;

opening means in the base member intersecting said positioning means, the overall combined, transverse, cross-sectional shape of said opening means being defined by an outline which has an elongated shape essentially the size and shape as said outline defining the overall shape of said legs;

said elongated outline of said opening means extending longitudinally in a direction oblique to the said first predetermined direction of said positioning means whereby when said legs are pushed through said opening means the sides of said opening means engage said legs to guide and orient said cutting edges into piercing relationship with a conductor located within said positioning means and thereby providing an electrical connection between said connection means and the conductor.

4,013,333

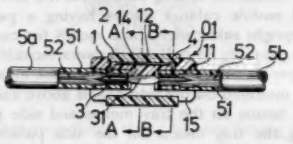
WIRE CONNECTOR

Te-Hsing Chang, No. 4-1, Lane 125, I Tung Street, Taipei, China /Taiwan

Filed Sept. 30, 1975, Ser. No. 618,746

Int. Cl.[2] H01R *11/20*

U.S. Cl. 339—98 **4 Claims**



1. A connector for connecting electrically conductive wires together comprising:

an inner socket of tubular construction, said inner socket comprising:

a longitudinal opening,

a partition wall disposed within said opening dividing said opening into two sections adapted to receive the ends of electrically conductive wires to be connected;

enlarged portions at opposite ends of the inner socket establishing therebetween a portion of reduced cross-section;

a split extending completely through the outer periphery of said inner socket and said enlarged portions;

a shallow groove formed in the outer periphery of said portion of reduced corss-section, said groove extending parallel to the axis of said opening and having holes at the ends thereof communicating with said two sections of said opening;

an outer socket of tubular construction configured to fit around said portion of reduced cross section;

an electrically conductive needle fixedly secured within said partition wall so as to extend axially within said inner sleeve, said needle having points at both ends projecting beyond the partition wall and into the opening sections so as to penetrate the ends of the electrically conductive wires being connected; and

a spike insertable in said portion of reduced cross section, said spike including a bight portion sized for reception in said groove, and pointed arm portions positioned to extend through said holes and penetrate the ends of the electrically conductive wires being connected;

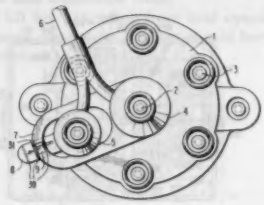
said outer socket being insertable around said portion of reduced cross section to cover said spike and tighten said portion of reduced cross section against the ends of the electrically conductive wires being connected.

4,013,334

DIAGNOSTIC APPARATUS

Horst Behnke, Esslingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed June 9, 1975, Ser. No. 584,726
Claims priority, application Germany, June 14, 1974, 2428761
Int. Cl.² H01R 3/00
U.S. Cl. 339—113 R 20 Claims



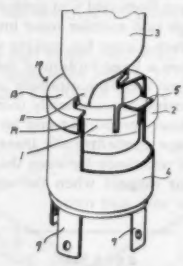
1. A diagnostic apparatus with at least two pick-up means for picking up measurement values, characterized in that each pick-up means is constructed as an adaptor plug means for establishing a path between at least two parts to be connected, and in that a connecting means is provided for connecting the pick-up means together while enabling the pick-up means to be movable relative to one another.

4,013,335

LAMP CAPS FOR HALOGEN LAMPS AND THE LIKE

László Várkonyi; György Szabó; József Ortó; László Nagy; János Spielmann; György Rabatin, and István Pozsonyi, all of Budapest, Hungary, assignors to Egyesult Izzolampa Es. Villamossagi Resveny tarsasag, Budapest, Hungary

Filed July 2, 1975, Ser. No. 592,793
Claims priority, application Hungary, July 3, 1974, EE 2251
Int. Cl.² H01J 5/56
U.S. Cl. 339—144 R 10 Claims



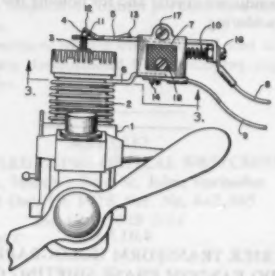
1. In a lamp cap for interconnecting an elongated, constricted neck of a lamp to an electrode-bearing lamp holder, a cover disc overlying the lamp neck and engageable with the lamp holder, the cover disc having a radially inwardly extending flange on an inner end thereof, an elongated, hollow deformable insert positionable inside and coaxially with the cover disc for frictional engagement with the periphery of the lamp neck, and means for affixing the insert to the cover disc, the improvement in which the sleeve has a plurality of circumferentially spaced parallel slits extending axially along its peripheral wall from the inner end thereof; in which the insert includes an integral lug extending radially outwardly from the inner end of at least one portion of the sleeve located between adjacent ones of the slits; and in which the affixing means comprises means for engaging the lug with the flange of the cover disc.

4,013,336

CONNECTOR CLIP

Dewey O. Broberg, Jr., Rte. No. 1, P.O. Box 102, Long Grove, Ill. 60047

Filed Mar. 25, 1976, Ser. No. 670,436
Int. Cl.² H01R 13/54
U.S. Cl. 339—253 R 11 Claims



1. A connector clip for releasably attaching a source of electrical current to the glow plug of a miniature internal combustion engine comprising:

a first slidably disposed conductive means for receiving the insulated tip of the glow plug of said engine, having means associated therewith to limit the sliding motion thereof;

a second conductive means for engaging said engine, and adapted for insertion between adjacent cooling fins thereof;

an insulator body separating the first and second conductive means; and

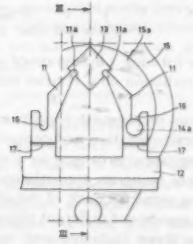
means for applying force to cause one of said conductive means to move in a substantially parallel direction relative to the other of said conductive means, thereby securing said connector clip to said engine.

4,013,337

CONNECTION LUGS IN THE FORM OF A COMB FOR POWER TRANSISTORS

Bernard Roger, Carpiquet; Michel Ayel, Evrecy, and Francis Debar, Thaon, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,439
Claims priority, application France, July 8, 1974, 74.23644
Int. Cl.² H01R 13/12
U.S. Cl. 339—258 R 3 Claims



1. A connection lug assembly for power semiconductor devices, comprising:

a generally planar base;

a generally planar platform on said base for supporting a semiconductor crystal, said platform having a side surface in upstanding relationship with said base;

a frame strip bent longitudinally into a Z-shape to abut said base and side surface of said platform and to overhang said platform;

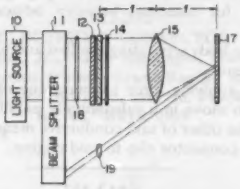
connection strips integrally formed with said frame strip and supported from one end thereby over said platform, said connection strips each having a slot;

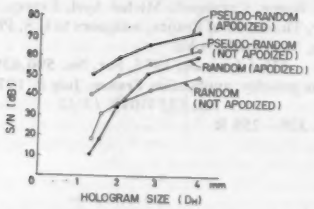
a rigid conductor corresponding to and received by each slot, said conductors being disposed generally perpendicular to said base and having widened heads for cooperation with said slots to press said connection strips toward said platform for contacting predetermined places on the semiconductor crystal and for holding the crystal in place until soldering.

4,013,338
FOURIER TRANSFORM HOLOGRAPHY USING PSEUDO-RANDOM PHASE SHIFTING OF OBJECT ILLUMINATING BEAMS AND APODIZATION

Isao Sato, and Makoto Kato, both of Kadoma, Japan, assignors to Matsushita Electric Industrial Company, Limited, Japan

Filed Jan. 26, 1976, Ser. No. 652,154
Claims priority, application Japan, May 13, 1975, 50-56960
Int. Cl.² G03H *1/16*
U.S. Cl. 350—3.5 **7 Claims**





1. A system for forming a hologram of an array of beams of electromagnetic radiation on a Fourier transform plane, comprising:

a pseudo-random phase mask receptive in use of a beam of electromagnetic radiation and comprised of a plurality of phase shifting areas arranged in a pattern of rows and columns, there being an approximately equal number of phase shifting areas for each of the different phase shifts, wherein the number of different phase shifts is N which is greater than three inclusive and each of the different phase shifts is one of the multiples of m360°/N, where *m* ranges from 1 to N, and the phase difference between orthogonally adjacent phase shifting areas is 360°/N, whereby the power spectrum of each of said phase-shifted beams on the Fourier transform plane distributes in orthogonal directions from the center maximum of the power spectrum;

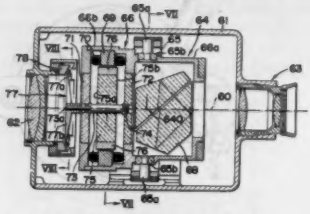
means for apodizing the phase-shifted beams; and

means for recording a Fourier transform hologram of said phase-shifted, apodized beams.

4,013,339
OPTICAL IMAGE STABILIZING SYSTEM

Kunio Ando, Warabi, and Takemi Saito, Kawagoe, both of Japan, assignors to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Mar. 21, 1974, Ser. No. 453,489
Claims priority, application Japan, May 18, 1973, 48-54674
Int. Cl.² G02B *23/02*
U.S. Cl. 350—16 **11 Claims**



1. An optical image stabilizing system comprising in combination,

a housing having an opening for the transmission of light,

a first stationary optical lens component having a straight line optical axis mounted on said housing for transmission of light passing through said housing opening,

gimbals mounted in said housing, said gimbals including an inner ring and an outer ring,

an inertially stabilized second optical component located on said first optical component optical axis, and forming an imaging system with said first optical lens component,

means for mounting said second optical component on said gimbals inner ring,

an electric motor including an annular rotor defining an inner space and an annular stator,

means for rotatably mounting said rotor on said inner ring,

means for fixedly mounting said stator on said inner ring,

said rotor providing an inertial means for inertially stabilizing the inner ring of said gimbals,

said annular rotor being located in enclosing relationship with said first optical lens component optical axis whereby light rays from said first optical lens component may pass through said annular rotor inner space,

and precession effect means for making said inner ring of the gimbals follow a large motion of said housing,

said precession effect means comprising an annular magnet fixed to said housing concentrically with said optical axis of said first optical component and an annular member fixed to said rotor concentrically therewith for creating an eddy current resistance between the annular member and said annular magnet when the annular member is rotated together with said rotor.

4,013,340
BINOCULAR

Tetsuro Mukai, 1-26, Nishi, Kawaguchi, Saitama, and Yoshiro Mukai, 2-5-5 Gotokiji, Setagaya, Tokyo, both of Japan

Filed May 22, 1975, Ser. No. 580,128
Claims priority, application Japan, June 1, 1974, 49-62394
Int. Cl.² G02B *23/02*
U.S. Cl. 350—36 **8 Claims**

1. A binocular comprising:

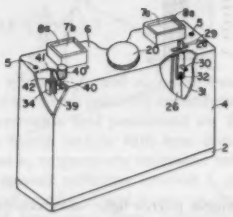
a. a bedplate having a pair of holes adapted to receive a pair of objective lenses,

b. a support frame standing on said plate that is provided with optical members adapted to guide the light passing through said objective lenses into each of eyepieces,

c. a casing provided with a pair of openings at its top portion to accommodate said eyepieces and detachably attached to said bedplate in a manner to cover said support frame,

d. a lift nut installed within a cylindrical guide formed in the upper portion of said support frame, said cylindrical guide having a lengthwise opening in its side and being provided with a top portion, said lift nut being screwed onto the external thread of a lower portion of an adjustable shaft and the upper end thereof extending upwardly through a hole formed in said top portion of said casing in such a manner that it may be moved upwardly or downwardly by the clockwise or counterclockwise rotatative movement of said adjustable shaft,

e. a horizontal lift bar extending from said opening of said cylindrical guide, the center portion of said horizontal lift bar being attached to said lift nut,



f. an eyepiece tube attached to one end of said horizontal lift bar,

g. a slider fitted into a transverse groove formed in the other end of said horizontal lift bar and having an oblique slot said slider being designed to move on either side by the clockwise or counterclockwise rotatative movement of a manual member provided on the outside of said casing, and

h. an eyepiece tube having a pin extending from its side portion and designed to move upwardly or downwardly by the movement of said slider on either side, said pin being inserted into an intersecting point between said oblique slot of said slider and a longitudinal slot provided in said other end of said lift bar.

4,013,341

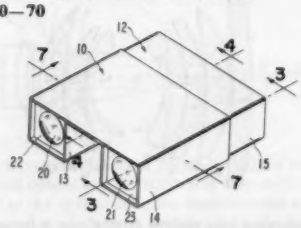
COLLAPSIBLE BINOCULAR INSTRUMENT

William T. Riley, 900 Welch Road, Suite 205, Palo Alto, Calif. 94303

Continuation-in-part of Ser. No. 540,377, Jan. 13, 1975, abandoned. This application Feb. 4, 1976, Ser. No. 655,185

Int. Cl.² G02B *7/02, 27/02*

U.S. Cl. 350—70 **31 Claims**



1. A collapsible binocular instrument comprising:

a collapsible objective lens housing having first and second mutually parallel laterally spaced optical column portions;

first and second objective lens mounting elements moveably secured at an objective end of said first and second column portions, respectively, said first and second objective lens mounting elements including first and second objective lens means, respectively;

a collapsible ocular lens housing having first and second mutually parallel laterally spaced optical column portions;

and first and second ocular lens mounting elements moveably secured at a viewing end of said first and second column portions of said ocular housing, said first and second ocular lens mounting elements including first and second ocular lens means, respectively;

each of said lens mounting elements being moveable from a first viewing position in which said lens means are arranged with their optical axes substantially parallel to the axis of their respective column portions to a second storage position;

said column portions of said objective and said ocular lens sections being dimensioned for telescoping engagement therebetween.

4,013,342

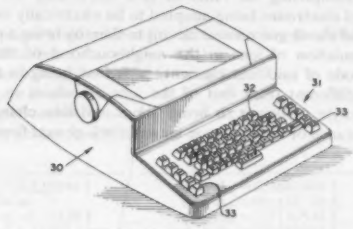
KEYBOARD USING OPTICAL SWITCHING

Leo H. Narodny, Martin's Bay, St. John, Barbados

Filed Dec. 19, 1975, Ser. No. 642,305

Int. Cl.² G02B *5/14*

U.S. Cl. 350—96 C **7 Claims**



1. A system for coupling light transmitted in a first optical fiber bundle to a second optical fiber bundle comprising,

a. a reflecting surface having a semi-ellipsoidal cavity, the major axis of said ellipsoid being in the plane of the open end of the reflecting surface,

b. said first and second fiber bundles located at the foci of said semi-ellipsoidal reflecting surface when in a light coupling position,

c. the ends of said first and second fiber bundles pointing toward said semi-ellipsoidal reflecting surface,

d. said semi-ellipsoidal reflecting surface and said pair of fiber bundles movable relative to one another to displace one of said bundles from the location of the foci of the semi-ellipsoidal reflecting surface so that cutoff of light is accomplished, whereby light is coupled from said first fiber bundle to said second fiber bundle when the ends of the fiber bundles are located at the foci of said semi-ellipsoidal reflecting surface and light transmitted in said first fiber bundle is not so coupled when said elements are relatively displaced.

4,013,343

ELECTRO-OPTICAL DISPLAY ARRANGEMENT WITH STORAGE EFFECT USING A SOLID ELECTROLYTE

Pierre-Ernest Jaccard, Bienne, and Heinrich Hess, Nidau, both of Switzerland, assignors to Societe Suisse pour l'Industrie Horlogere Management Services, S.A., Bienne, Switzerland

Filed Dec. 26, 1974, Ser. No. 536,578

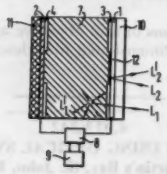
Claims priority, application Sweden, Jan. 31, 1974, 741313

Int. Cl.² G02B *5/23;* **G02F** *1/36*

U.S. Cl. 350—160 R **29 Claims**

1. An electro-optical display arrangement with storage effect adapted to be activated by an electronic control circuit comprising a voltage source, said display arrangement comprising a first element and a second element positioned on opposite sides and enclosing a system which includes at least one solid crystalline electrolyte of a type which enables the selective transport of ions through the application of an elec-

trical control signal between two control electrodes in contact with the solid crystalline electrolyte, at least one of said electrodes being transparent to light in the visual domain of electromagnetic radiation, said first element comprising a transparent one of said electrodes and comprising between said electrode and said solid electrolyte a transparent electrical insulator at selected portions leaving a potentially visible pattern defined by locations at which said electrode is electri-



cally in contact with said solid electrolyte, said second element comprising the other of said electrodes, the said two control electrodes being adapted to be electrically coupled to the said electronic control circuit to thereby bring a reversible accumulation of ions in the neighbourhood of the control electrode of said first element, such ions being in a valence state different from that of the ions elsewhere in the solid electrolyte sufficient to bring about a visible change in the appearance of the display as viewed through said first element.

4,013,344

DISPLAY DEVICE

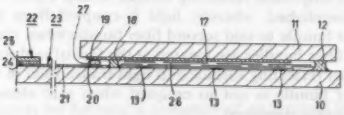
Francois Joseph Marie Bescond, Dueil, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 585,388

Claims priority, application France, June 24, 1974, 74.21835

Int. Cl.² G02F 1/13; H01R 13/24

U.S. Cl. 350—160 LC **4 Claims**



1. A display device comprising two parallel spaced apart supporting plates, at least one electrode on the surface of each supporting plate, spacer means separating said plates and defining therewith a closed circumference, a display medium filling the volume defined by said supporting plates and said spacer member, said electrodes extending on parts of the supporting plates outside the said volume, connection strips on one of the supporting plates for electrical connection to said electrodes, contact means providing an electric connection between a connection strip and a corresponding electrode which is provided on the oppositely located supporting plate, said means comprising a pill having a surface area measured in a direction parallel to the surface of the supporting plate which is smaller in all directions than the surface area of the conductive surfaces with which the surface area of the pill is in contact so that the said contact cannot extend further than said surface, said pill consisting of a kneadable conductive material.

4,013,345

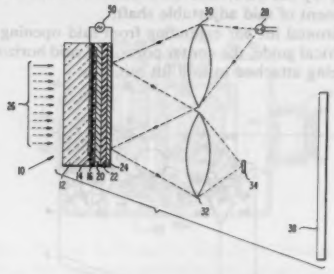
DEFORMABLE MIRROR LIGHT VALVE AND METHOD OF OPERATING THE SAME

William Ronald Roach, Rocky Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,899

Int. Cl.² G02F 1/34

U.S. Cl. 350—161 S **8 Claims**



1. A deformable mirror light valve comprising:

a transparent substrate of electrically insulating material,

a plurality of transparent electrodes on one surface of said transparent substrate,

a photoconductor layer on said transparent electrodes,

an elastomer layer on said photoconductor layer,

a deformable mirror on said elastomer layer, and

means for applying a separate biasing voltage to each one of said transparent electrodes while said light valve is subjected to scanning addressing light with voltage reversals in the area of said photoconductor layer which corresponds to each one of said transparent electrodes being substantially coincident with said scanning addressing light.

4,013,346

ENLARGING LENS SYSTEM

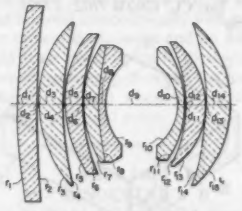
Masaki Matsubara, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 12, 1976, Ser. No. 648,569

Claims priority, application Japan, Jan. 13, 1975, 50-6183

Int. Cl.² G02B 13/24, 9/64

U.S. Cl. 350—176 **6 Claims**



1. An enlarging lens system comprising a front lens group arranged on the object side of the stop and a rear lens group arranged on the image side of the stop, said front lens group comprising a first, second, third and fourth lens components, said first lens component being a positive meniscus lens, said second lens component being a positive meniscus lens, said third lens component having positive refractive power, said fourth lens component having negative refractive power, said rear lens group comprising a fifth, sixth and seventh lens components, said fifth lens component having negative refractive power, said sixth lens component being a positive meniscus lens, said seventh lens component being a positive meniscus lens, said enlarging lens system satisfying the following conditions:

$$1.75 < n_a < 1.85 \quad (1)$$

$$1.72 < n_b < 1.85 \quad (2)$$

$$0.3f < |f_a| < 0.8f \quad (3)$$

$$0.3f < |f_b| < 0.8f \quad (4)$$

$$0.4f < \frac{r_c}{n_c - 1} < 0.9f \quad (5)$$

$$0.3f < \frac{r_d}{n_d - 1} < 0.6f \quad (6)$$

$$0.8 < \frac{f_I}{f_{II}} < 1.5 \quad (7)$$

wherein reference symbols n_a and n_b respectively represent refractive indices of lenses respectively constituting the fourth and fifth lens components and positioned on the stop side therein (when the fourth and/or fifth lens components are single lenses, n_a and n_b respectively represent refractive indices of those single lenses), reference symbols f_a and f_b respectively represent focal lengths of said lenses on the stop side in the fourth and fifth lens components, reference symbols n_c and n_d respectively represent refractive indices of lenses respectively constituting the third and sixth lens components and positioned on the outer side therein (when the third and/or sixth lens components are single lenses, n_c and n_d respectively represent refractive indices of those single lenses), reference symbols r_c and r_d respectively represent radii of curvature of outer lens surfaces of the third and sixth lens components, and reference symbols f_I, f_{II} and f respectively represent focal lengths of the front lens group, rear lens group and lens system as a whole.

4,013,347
MOVABLE FILTER OPTICAL SYSTEM FOR PROVIDING IMPROVED OPTICAL TRANSMISSION CHARACTERISTICS

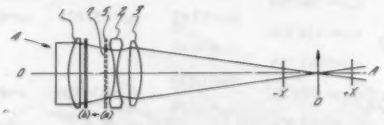
Akiyoshi Nakamura, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 2, 1975, Ser. No. 573,917

Claims priority, application Japan, May 4, 1974, 49-50020

Int. Cl.² G02B 5/02; G03B 3/00

U.S. Cl. 350—188 **23 Claims**



1. In a lens system having a plurality of lens components arranged on an optical axis for refracting transmitted light rays non-parallel to the optical axis, the improvement comprising:

at least one optical element positioned on the image space side of the lens components and capable of intersecting the refracted light rays traveling non-parallel through the lens system; and

means for moving the optical element along the optical axis, said optical element including a marginal area having a characteristic of influencing the transmission of a light ray passing therethrough and an inner area having a characteristic of transmitting any incident light ray with substantially no influence on the properties of the light ray, the axial movement of said optical element varying the amount of light rays transmitted non-parallel to the optical axis which pass through said marginal area of said optical element.

4,013,348
OPTICAL SYSTEM FOR REPRODUCTION

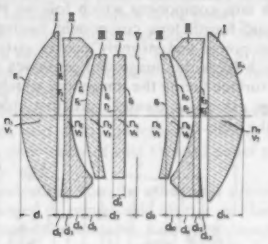
Yu Yamada, Kokubunji, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,263

Claims priority, application Japan, May 13, 1974, 49-53001

Int. Cl.² G02B 9/60

U.S. Cl. 350—196 **2 Claims**



1. An optical system for reproduction having the following lens specifications:

the F-number of the image forming lens: 5

the picture angle: 40°

the magnification factor: 1–1.6

the focus distance: 280 mm

$r_1 = -r_{14} = 0.226896$ f	$d_1 = d_{14} = 0.0641808$ f
$r_2 = -r_{13} = \infty$	$d_2 = d_{13} = 0.0135136$ f
$r_3 = -r_{12} = -3.74228$ f	$d_3 = d_{12} = 0.0110534$ f
$r_4 = -r_{11} = 1.77267$ f	$d_4 = d_{11} = 0.0249592$ f
$r_5 = -r_{10} = 0.322519$ f	$d_5 = d_{10} = 0.0260289$ f
$r_6 = -r_9 = 0.564898$ f	$d_7 = 0.0695292$ f
$r_7 = \infty$	$d_8 = 0.0213936$ f
$r_8 = \infty$	$d_9 = 0.0508455$ f
$n_1 = n_7 = 1.63854$	$\nu_1 = \nu_7 = 55.4$
$n_2 = n_6 = 1.58215$	$\nu_2 = \nu_6 = 42.1$
$n_3 = n_5 = 1.60729$	$\nu_3 = \nu_5 = 49.3$
$n_4 = 1.51633$	$\nu_4 = 64.1$

whereby

f = focus distance

$r_1 - r_{14}$: radius of curvature

$d_1 - d_{14}$: thickness of air spaces and lenses

$n_1 - n_7$: refractive index of lenses for d-line

$\nu_1 - \nu_7$: dispersion of lenses for d-line

r_7, r_8: radius of curvature

n_4: refractive index of filter for d-line

ν_4: dispersion of filter for d-line.

4,013,349
WIDE-ANGLE OBJECTIVE

Ludwig Bertele, and Klaus W. Hildebrand, both of Heerbrugg, Switzerland, assignors to Wild Heerbrugg Aktiengesellschaft, Heerbrugg, Switzerland

Filed Apr. 17, 1975, Ser. No. 569,278

Claims priority, application Switzerland, Apr. 22, 1974, 5494/74

Int. Cl.² G02B 9/64

U.S. Cl. 350—214 **2 Claims**

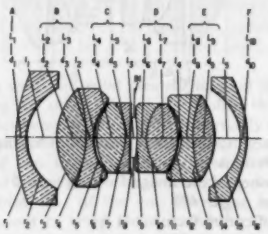
1. A wide-angle objective composed of six components separated from each other and located three at the object side of diaphragm and three at the image side of such diaphragm, said six lens components taken in consecutive order from the side of the object comprising:

a. a first lens component with dispersing refractive power composed of at least one meniscus lens member curved towards the object side;

b. a second lens component which follows an air space composed of a dispersing meniscus lens component curved towards the object side;

c. a third lens component which follows a small air space and possessing a collecting refractive power and having a strongly convex curved outer surface facing the object side, said third lens component comprising at least two lens members and having a convex cemented surface facing the object side which at the side of the object possesses a greater refractive index than at the image side, one of said two lens members is a dispersing lens member situated closest to the diaphragm;

d. a fourth lens component which follows the diaphragm space, said fourth lens component having a collecting refractive power and strongly convex curved outer surface which faces the image and possesses a concave cemented surface facing the image and which at the side of the image exhibits a greater refractive index than at the side of the object;



e. a fifth lens component comprising a dispersing meniscus lens component which is curved towards the image;

f. a sixth lens component with dispersing power which follows an air space and composed of at least one meniscus lens member curved towards the image;

g. the difference of the reciprocal values of the radii of curvature of the lens surfaces bounding the diaphragm space being greater than 0.43/F and smaller than 1.3/F;

h. the axial spacing of the convex surfaces of the second and fifth lens components, and which convex surfaces face away from the disphragm, is in the order of about between 0.64 F and 1.1 F;

i. the focal length of the first lens component facing the object is greater than −0.7 F and smaller than −1.6 F; and

j. wherein the symbol F represents the focal length of the entire objective.

4,013,350

LARGE APERTURE SUPERWIDE-ANGLE LENS

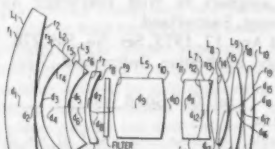
Ryota Ogawa, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1975, Ser. No. 608,948

Claims priority, application Japan, Aug. 29, 1974, 49-99178

Int. Cl.² G01B *13/04*

U.S. Cl. 350—214 **2 Claims**



1. A miniature and large aperture superwide-angle lens of the retrofocus type comprising ten lenses grouped in nine components wherein the first lens is a convex lens whose surface of greater curvature is convex to the object, the second lens is a negative meniscus lens, the third lens is a negative meniscus lens, and the fourth lens is a negative meniscus lens, said second, third and fourth lenses being concave to the image, the fifth lens is a double-convex lens, the sixth and seventh lenses constitute a cemented doublet, said sixth lens being a double-convex lens whose surface of greater curvature is cemented with said seventh lens, said seventh lens being a double-concave lens, the combination of said sixth and seventh lenses forming a negative lens, the eighth lens is a positive meniscus lens whose surface of greater curvature is convex to the image, the ninth lens is a convex lens, and the tenth lens is a convex lens, said ninth and tenth lenses having their surfaces of greater curvature convex to the image, and a filter located between said fourth and fifth lenses, wherein the radii of curvature r_1 to r_{19}, the lens thicknesses and lens separations d_1 to d_{18} the refractive indices η_1 to η_{10}, and Abbe numbers ν_1 to ν_{10} of said first to tenth lenses L_1 to L_{10}, respectively, satisfy the following conditions:

$F = 100$, aperture ratio 1:2, Angle of view $2\omega = 94.6°$

$F_{1,2,3,4} = -87.674$

$F_{1,2,3,4,5,6,7} = -136.712$

Backfocus = 193.146

$\Sigma\rho = 0.075$

Lens L	Radius of Curvature r	Lens Thickness or Spacing d	Refractive Index η	Abbe No. ν
L_1	r_1=339.720	d_1=49.41	η_1=1.64000	ν_1= 60.2
	r_2= 952.881	d_2= 0.49		
L_2	r_3=218.581	d_3= 9.95	η_2=1.74320	ν_2=49.4
	r_4= 93.059	d_4=32.61		
L_3	r_5=162.580	d_5= 8.74	η_3=1.51821	ν_3=65.0
	r_6= 76.282	d_6=24.31		
L_4	r_7=213.538	d_7= 8.74	η_4=1.74320	ν_4=49.4
	r_8= 97.733	d_8=26.69		
		(Thickness of filter = 7.28)		
L_5	r_9= 202.478	d_9=81.34	η_5=1.78470	ν_5=26.2
	r_{10}=−272.635	d_{10}=28.77		
L_6	r_{11}= 857.551	d_{11}=33.97	η_6=1.64000	ν_6=60.2
L_7	r_{12}=−126.036	d_{12}= 4.85	η_7=1.84666	ν_7=23.9
	r_{13}= 276.629	d_{13}=14.56		
L_8	r_{14}=−766.797	d_{14}=17.62	η_8=1.51821	ν_8=65.0
	r_{15}=−124.736	d_{15}= 0.49		
L_9	r_{16}=5992.735	d_{16}=17.96	η_9=1.74320	ν=49.4
	r_{17} =−233.291	d_{17}= 0.49		
L_{10}	r_{18}=5117.276	d_{18}=13.54	η_{10}=1.69680	ν_{10}=55.5
	r_{19}=−384.364			

4,013,351

CONVEX MIRROR AND FRAME

Ernest Haile, 30 Cadwalader Terrace, Trenton, N.J. 08618

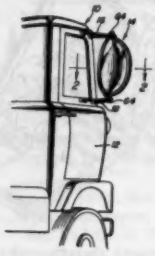
Filed Aug. 8, 1975, Ser. No. 603,244

Int. Cl.² G02B *5/10*

U.S. Cl. 350—293 **12 Claims**

1. A mirror construction comprising a mirror element including first and second opposite side edges, a mounting plate of a plan shape corresponding to the plan shape of said element over one side of which said element is placed in plan registry therewith, said plate including first and second opposite side edges corresponding with the first and second side

edges, respectively, of said element, the first side edge of said plate being generally straight and including a first flange extending therealong and projecting outwardly of said one side edge of said plate and including an outer free edge, said outer free edge of said first flange including opposite end portions which curve inwardly toward said plate, the free outer edge of said first flange terminating outwardly in a second inwardly directed flange overlying said one side of said plate in spaced relation relative thereto, the second side edge of said plate including opposite end portions which curve inwardly toward the remote ends of the first side edge of said plate, said second side edge end portions including retaining flange portions



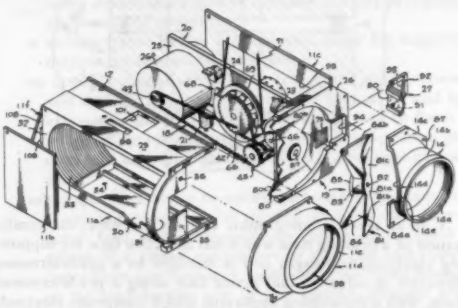
extending therealong, projecting outwardly of said one side of said plate and terminating outwardly in inturned flange portions overlying said one side of said plate in spaced relation relative thereto, said second side edge of said element being held captive within said retaining flange portions and beneath said inturned flange portions, said first side edge of said element overlying said second flange, and a cap panel removably secured over the outer side of said first flange and including an outer marginal edge corresponding to and projecting outwardly beyond said free outer edge of said first flange, said outer marginal edge of said cap panel terminating outwardly in an inturned retaining flange overlying the first side edge of said element.

4,013,352

SELF-BLIMPED MOTION PICTURE CAMERA

Jacob G. Monroy, 1038 N. Highland Ave., Hollywood, Calif. 90038

Filed Mar. 25, 1975, Ser. No. 561,696
Int. Cl.² G03B 31/00
U.S. Cl. 352—35 **9 Claims**



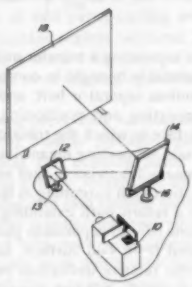
1. An unblimped motion picture camera comprising:
a housing,
a mounting frame floatingly, resiliently shock mounted within said housing, said frame including a plate to which all drive train components are mounted, and a forward panel affixed to said plate perpendicularly thereof, said drive train components consisting of:
a motor,
an idler assembly, including a shaft having an axis parallel to that of said motor and perpendicular to said frame, said shaft being journal mounted within sleeve bearings, there being a driven pulley and two driver pulleys affixed to said shaft,
a drive pulley for a film transport movement,
a first belt connecting said motor, said idler assembly driven pulley and said transport movement drive pulley,
a film-take-up reel drive clutch mechanism mounted on said plate and including a clutch drive pulley,
a second belt connecting one of said idler driven pulleys to said clutch drive pulley, said belt being arranged so that the rotational direction of said clutch mechanism is opposite to said motor,
a rotating shutter mechanism mounted to said frame forward panel, said shutter mechanism having a drive shaft extending rearwardly of said forward panel and attached to a pulley, and
a third belt extending from the other idler driven pulley and being arranged to engage said shutter mechanism pulley,
said motor, said idler assembly, said clutch mechanism, said film transport movement drive pulley and said shutter mechanism drive shafts all having sleeve bearings.

4,013,353

OPTICAL REFLECTING SYSTEM

Robert Portner, Blackwood, and Phillip Miller, Turnersville, both of N.J., assignors to Magna Mir, Inc., Philadelphia, Pa.

Continuation of Ser. No. 488,011, July 12, 1974, abandoned.
This application Jan. 7, 1976, Ser. No. 647,098
Int. Cl.² G03B 21/28; G02B 17/00, 5/10
U.S. Cl. 353—99 **1 Claim**



1. A reflection system comprising:
a light emitting projecting means from which intelligible images are projected;
said projecting means having a known focal length;
a receiving surface;
said receiving surface having a known maximum height and width;
said receiving surface further being positioned at a known elevation with respect to said projecting means;
an intermediate curved reflector positioned to receive beams from said projecting means and reflect said beams distortion-free against said receiving surface;
the projection axis of said beams as emitted from said projection means being substantially perpendicular to the plane in which said receiving surface lies;
said reflector having a surface curvature defined by a plurality of incremental arcs, the dimensions and angular disposition of which are successively determinable from each preceding incremental arc;
a central incremental arc having dimensions and angular disposition having been determined from said focal length, said maximum height, said maximum width and said elevation, from which the first of said successive determinations is determinable; and,
said plurality of incremental arcs having dimensions and angular disposition which are proportional to the dimen-

sions and angular disposition of each said preceding incremental arc and the number of all said preceding incremental arc.

4,013,354

APPARATUS FOR SEPARATING TRANSFER MATERIAL IN AN ELECTROSTATIC COPYING DEVICE

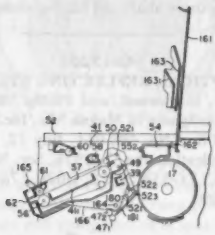
Shigehiro Komori; Hisashi Sakamaki, both of Yokohama; Hiroyuki Hattori, Mitaka; Toshihide Iida; Koichi Miyamoto, both of Tokyo, and Kazumi Umezawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 413,221, Nov. 6, 1973, which is a division of Ser. No. 258,820, June 1, 1972, Pat. No. 3,804,512. This application May 28, 1975, Ser. No. 581,546

Claims priority, application Japan, June 3, 1971, 46-38917; June 3, 1971, 46-38918; June 9, 1971, 46-48632; June 10, 1971, 46-41196; June 10, 1971, 46-41195; June 10, 1971, 46-41197; June 21, 1971, 46-44611; Aug. 30, 1971, 46-66740

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 R **5 Claims**



1. A device for separating a transfer material from a surface to which the material is brought in contact comprising:

a rotatable, endless separator belt; and

means for supporting and positioning said separator belt along the surface to which the transfer material is brought in contact, said supporting means including a plurality of deflecting means for twisting said separation belt to define a separation path extending at least in part along said surface and a return path extending in a plane different from the plane of said separation path so that said return path is spaced from said surface, said deflecting means minimizing the relative deflection between said paths to thereby minimize the twisting of said separator belt, said supporting means further including rotatable means mounted adjacent to said surface and said separation path for guiding the transfer material into contact with said surface so that a portion of the transfer material is gripped between the separator belt and the rotatable means, and wherein rotation of said rotatable means causes the gripped portion of the transfer material to separate from said surface.

4,013,355

NOTCH FILTER FOR COLOR TRANSPARENCY COPYING MACHINES

Louis D. Mailloux, Arcadia, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed July 30, 1975, Ser. No. 600,345

Int. Cl.² G03G *15/01*

U.S. Cl. 355—4 **12 Claims**

1. An electrophotographic printing machine for reproducing a color transparency, including:

a photoconductive member;

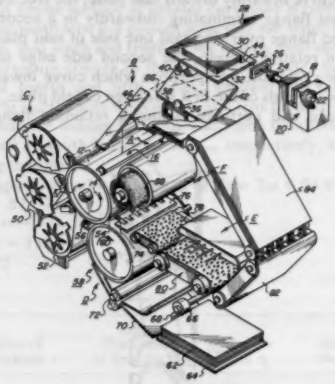
means for producing a charge having a substantially uniform level on at least a portion of said photoconductive member;

means for forming a light image of the color transparency;

means for modulating the light image to produce a halftone light image;

means for filtering successive light images of the color transparency to form successive blue, red, and green light images thereof; and

a notch filter interposed into the optical path to block a portion of the red light image while transmitting the blue



and green light images therethrough, each light image transmitted through said notch filter passing through said filtering means and said modulating means to irradiate the charged portion of said photoconductive member recording thereon successive single color electrostatic latent images.

4,013,356

APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH LIQUID TONER

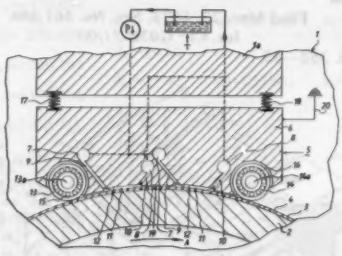
Friedrich Bestenreiner, Grunwald; Dieter Gigiberger, Unterhaching, and Gert Weidkuhn, Freiburg, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Apr. 10, 1975, Ser. No. 566,685

Claims priority, application Germany, Apr. 11, 1974, 2417721

Int. Cl.² G03G *15/10*

U.S. Cl. 355—10 **9 Claims**



1. In an electrophotographic copying machine, the combination of a printing base which has an active face for supporting electrostatic images and is movable in a predetermined direction to advance said active face along a predetermined path, with a developing apparatus which comprises electrode means adjacent to and having a side substantially parallel to said path so that said electrode means and said active face define narrow clearances, means for circulating liquid toner in said clearances having liquid supplying port means at one end and liquid evacuating port means at the other end of each of said clearances, as considered in said direction, arranged to supply and evacuate liquid toner in direction making oblique angles with said predetermined direction, wherein the number of clearances is *n* and

$$n = \frac{\ln \frac{\delta_n}{\delta_0}}{\ln\left(1 - \frac{dq}{m\delta_0}\right)}$$

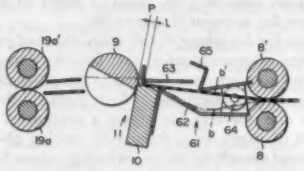
wherein, $\delta 0$ is the initial density of charge of an image on said printing base, δn is the remaining density of charge of a developed image, d is the distance between said side and said active face, q is the average charge of toner particles, and m is the average mass of toner particles.

4,013,357

COPYING MACHINE IN WHICH, PAPER JAMMING AT COPYING PAPER CUTTING MECHANISM IS PREVENTED

Tadanobu Nakajima, Kashihara, and Tatsuo Aizawa, Osaka, both of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan

Filed Aug. 19, 1975, Ser. No. 605,925
Claims priority, application Japan, Aug. 23, 1974, 49-96705
Int. Cl.² G03G *15/00*
U.S. Cl. 355—13 **6 Claims**



6. An electrophotographic copying machine comprising:

a paper feed device for feeding a roll-like copying paper;

a copying paper transfer passage including a zone of a charging device, a light exposure zone, a zone of a developing device and a zone of a drying or fixing device in the above recited sequence;

a moving frame having a transparent plate for supporting thereon an original to be copied;

an optical system fixed in the machine to optically connect said transparent plate of said moving frame to said light exposure zone of said transfer passage and to focus an image of the original supported on said transparent plate onto said copying paper travelling in said light exposure zone;

said paper feed device comprising a feed reel for supporting a copying paper wound thereon in a roll-like form; a paper feed roller intermittently driven and rotated by means of a clutch mechanism to take out said copying paper from said feed reel; an introduction roller disposed on the introduction side of said transfer passage; and a copying paper-cutting mechanism disposed between said paper feed roller and said introduction roller to cut said copying paper taken out of said feed reel into a prescribed length;

said moving frame including a cut length-designating mechanism for designating a cut length of said copying paper corresponding to a predetermined light exposure range of said original;

first detecting mechanism means provided adjacent the introduction end of said light exposure zone in said transfer passage to detect the forward end of the travelling copying paper, and to actuate first switch means so that the actuation of said first switch means is maintained while the copying paper is travelling;

second detecting mechanism means provided on a moving passage of said moving frame to detect said cut length-designating mechanism of said moving frame which is travelling along the moving passage of said moving frame and to actuate second switch means;

said first and second detecting mechanism means being disposed in such a positional relationship that when said moving frame moves from an exposure step initiating point by a distance $(l_x - l_{min})$ equal to the difference of the length (l_x) of said predetermined light exposure range from the distance (*l*min) between said cutting position and said first detecting mechanism means, said second detecting mechanism means detects said cut length-designating mechanism means, by actuation of said first switch means, the movement of said moving frame for the light exposure step is initiated and said paper feed roller is released from the connection with a drive mechanism therefor by means of said clutch mechanism and is driven idly, by actuation of both the first and second switch means, said copying paper-cutting mechanism is actuated to cut said copying paper in a length corresponding to the light exposure range length of the original to be copied while said copying paper is placed under a certain tension;

paper jamming-preventing mechanism means positioned in said paper feed device to stop the front end of said copying paper, which is present at the cutting position when the operation of said paper-cutting mechanism is completed, at a position slightly retreated from said cutting position and to make the front end of said copying paper stand by for the next copying operation at this retreated position;

said paper jamming-preventing mechanism means including a copying paper transfer passage-regulating mechanism disposed so that two copying paper transfer passages having differing passage lengths are formed between said paper feed roller and said cutting mechanism;

said copying paper transfer passage-regulating mechanism being disposed with such a positional relation to said paper feed roller that while said paper feed roller is driven, the roll-like copying paper is moved along the longer said transfer passage by the driving force given to said copying paper by said paper feed roller, and that when said feed roller is released from the connection with the drive mechanism, supply of roll-like paper from said feed reel is interrupted, and thereafter said paper feed roller is driven by said copying paper whereby said roll-like copying paper is shifted from said longer transfer passage to the shorter said transfer passage, and the roll-like copying paper continues to move along said shorter passage;

said cutting mechanism being actuated while said roll-like copying paper is delivered along said shorter transfer passage, said roll-like copying paper being shifted from said shorter transfer passage to said longer transfer passage after the cutting operation, whereby the front end of said roll-like copying paper is stopped and made to stand by at a position retreated from said cutting position by a distance corresponding to the difference of the length between said two transfer passages; and

whereby, even if the transfer of said roll-like copying paper is started at a random position where the forward end of said roll-like copying paper is retreated from said cutting position, said copying paper can be cut precisely in a length corresponding to the desired copy length of the original.

4,013,358

DEVICE FOR ADJUSTING STARTING POSITION FOR TRANSFER-TYPE ELECTROPHOTOGRAPHIC REPRODUCING APPARATUS HAVING BELT-LIKE PHOTOSENSITIVE MEMBER

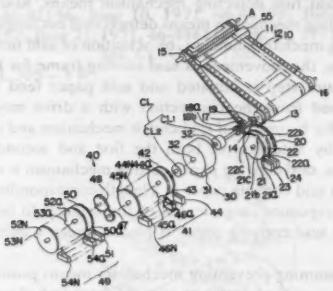
Yoshihisa Kawai, Hommachi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 18, 1975, Ser. No. 605,736

Claims priority, application Japan, Sept. 2, 1974, 49-105715[U]

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 13 Claims



1. In a transfer-type electrophotographic reproducing apparatus having an image-forming system, a photosensitive member unit mounted for withdrawal from and insertion into the apparatus, the unit containing a photosensitive belt having a seam and being trained about a plurality of rollers for rotation to at least one position in an area receiving an image from the image-forming system when reproduction is initiated, and a drive source adapted to engage at least one of the rollers for providing the rotation, the engaging of the drive source with the one roller being conditionally enabled upon insertion of the unit into the apparatus and being disabled upon withdrawal therefrom, the improvement comprising the combination therewith of a device for adjusting a starting position of the belt, including

a. a belt-position-adjusting control mounted in the unit for synchronous movement with the belt,

b. means actuated by said adjusting control and adapted for

b. means actuated by said adjusting control and adapted for engaging the drive source with the one roller to drive the belt while said seam is located within the image-receiving area,

c. means actuated by the adjusting control and adapted for disengaging the drive source from the one roller to stop the belt when the seam is located at a given position outside the image-receiving area,

d. a reproduction starting means for engaging the drive source with the one roller in response to said initiated reproduction, and

e. means inhibiting said reproduction starting means while the seam is located within the image-receiving area, whereby the seam is prevented from occupying the image area during reproduction and reproduction initiation is prevented when the seam is in the image area.

4,013,359

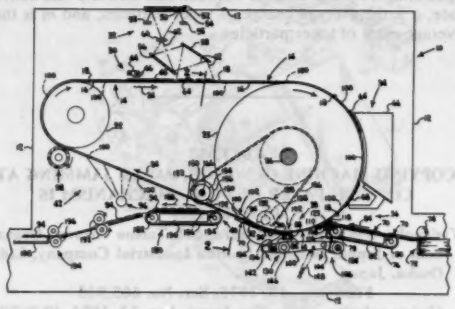
ELECTROSTATIC COPIER INCLUDING MEANS FOR DETACHING PAPER FROM A PHOTOCONDUCTOR

Robert Clark DuBois, Fairfield; Eugene Patrick Lavin, Stratford, and Joseph F. Miciukiewicz, Trumbull, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Aug. 23, 1974, Ser. No. 500,048

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 9 Claims



1. In a copier including means for supplying electrostatic charge, apparatus for handling a sheet of paper comprising:

a. paper conveying means including a movable plate-type photoconductor adapted to be sufficiently electrically energized from said charge supplying means for electrostatically attaching the sheet of paper to the photoconductor for movement therewith;

b. means for detaching the attached sheet of paper from the moving photoconductor, said detaching means including at least one aperture formed in the photoconductor and finger means insertable at least partially through said at least one aperture for urging a portion of the attached sheet of paper away from said moving photoconductor and said detaching means including means for moving the inserted finger means in the direction of movement of said photoconductor.

4,013,360

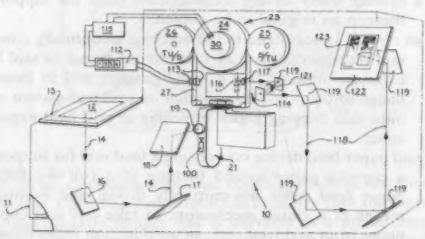
INFORMATION STORAGE SYSTEM

Richard J. Burke, Saratoga, and Charles J. Becker, San Jose, both of Calif., assignors to American Videonetics Corporation, Sunnyvale, Calif.

Filed June 27, 1973, Ser. No. 374,048

Int. Cl.² G03B *27/32*

U.S. Cl. 355—27 7 Claims



1. In an information storage system, first and second films each capable of having a plurality of images recorded at different locations thereon, a recording station for recording an image of an object upon said first film, a transfer station for transferring an image from the first film to the second film, means for moving said first film independently of said second film along a predetermined path from the recording station to the transfer station, means for moving the second film independently of the first film along a second path including said

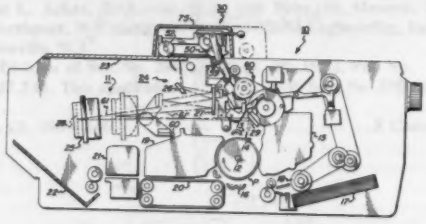
transfer station, whereby any desired location on the first film can be aligned with any desired location on the second film at the transfer station, and means for transferring an image from the desired location on the first film to the desired location on the second film when said locations are aligned at the transfer station.

4,013,361

OPTICAL APPARATUS AND REPRODUCING MACHINE

Robert F. Allis, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 20, 1975, Ser. No. 588,973
Int. Cl.² G03B 27/70
U.S. Cl. 355—60 **24 Claims**



1. In an apparatus for viewing an original and for projecting an image thereof onto a moving imaging surface, said apparatus including a lens arranged along an optical path, means for changing the projected image magnification, said magnification changing means including means for translating said lens in a plane of motion between first and second discrete positions so that the projected magnification is a function of the lens position, the improvement wherein:

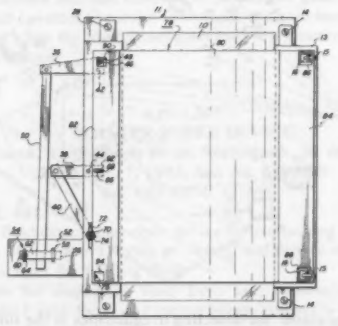
means are provided for automatically tilting said lens with respect to said plane of motion to a different extent at said first position than at said second position.

4,013,362

ADJUSTABLE FORMS GUIDE

Maynard K. Beckman, Jr., Plano, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 25, 1975, Ser. No. 616,520
Int. Cl.² G03B 27/62
U.S. Cl. 355—75 **7 Claims**



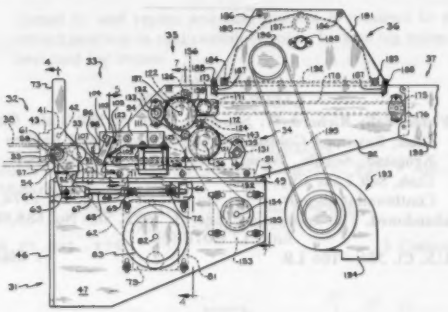
1. An adjustable guide for aligning a form on a platen comprising: a platen; support means extending along one side of said platen; first and second levers pivotally connected to said support about an axis generally transverse to said platen; said levers being spaced from each other in the direction in which said one side extends; a projection on each of said levers extending upwards in a direction generally transverse to said platen; a stationary projection extending from said support means in a direction generally transverse to said platen; said stationary projection being spaced from the other said projections in the direction in which said one side extends; the projection on said first lever and the pivotal axis of said first lever being arranged that when said first lever is pivoted, its projection will translate in a direction which is generally in the same direction in which said one side extends; the projection on said second lever and the pivotal axis of said second lever being arranged that when said second lever is pivoted, its projection will translate in a direction generally transverse to the direction the projection on said first lever translates; and means, located on the side of said platen opposite said one side, being biased away from said platen in the same general direction as said second lever projection translates.

4,013,363

VESICULAR FILM ADVANCING MODULE

Dean H. Putnam, Toledo, Ohio, assignor to Magnagard Equipment Manufacturing Corporation, Toledo, Ohio

Filed July 21, 1975, Ser. No. 597,443
Int. Cl.² G03B 27/04
U.S. Cl. 355—97 **9 Claims**



1. In a microfiche duplicator having a basic processing module for exposing an unexposed segment of continuous strip of microfilm to dulicate a master microfiche and a selected one of a plurality of film advancing modules, a film advancing module for separating, developing and collecting the exposed film segment comprising a plurality of film stations for performing selected operations on the film segment wherein at least two of said film stations are positioned to define a generally S shaped, compact path of travel for the film segment and wherein a third one of said plurality of film stations and one of said film stations positioned to define the generally S shaped, compact path of travel are connected in series to a means for directing a flow of cooling air therethrough.

4,013,364

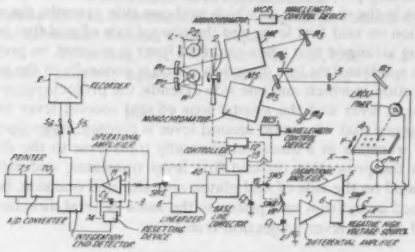
BASELINE CORRECTION IN DENSITOMETRICAL MEASUREMENTS

Kiyokazu Nakano; Hiroshi Yamamoto, both of Kyoto, and Yasunori Ito, Otsu, all of Japan, assignors to Shimadzu Seisakusho Ltd., Kyoto, Japan

Filed Aug. 22, 1975, Ser. No. 607,085
Claims priority, application Japan, Aug. 29, 1974, 49-99582
Int. Cl.² G01N 21/00; G01J 3/36
U.S. Cl. 356—73 **16 Claims**

1. A method of densitometrical measurement of a sample spot developed on a supporting medium, comprising: scanning a predetermined area of said medium reciprocally along a single locus across said spot with light; changing the wave length of said scanning light with each stroke of reciprocation; measuring the intensity of the light from said scanned area to

produce a corresponding electrical signal; periodically sampling said signal produced at a predetermined point outside said spot along said single locus each time said wavelength is



changed; holding said sampled signal for a predetermined period of time; and correcting said signal produced during scanning of at least said spot before the next sampling by said sampled and held signal.

4,013,365

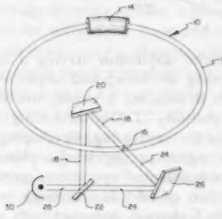
LASER GYROSCOPE

Victor Vali; Richard W. Shorthill, both of Salt Lake City, Utah; Raymond Goldstein, Arcadia, Calif., and Reuben S. Krogstad, Seattle, Wash., assignors to The University of Utah, Salt Lake City, Utah

Continuation-in-part of Ser. No. 501,917, Aug. 29, 1974, abandoned. This application June 11, 1975, Ser. No. 585,981

Int. Cl.² G01B *9/02*

U.S. Cl. 356—106 LR **1 Claim**



1. An apparatus for determining rotation of an area comprising:

a single optical fiber waveguide circumscribing the area 360°;

a gain medium optically coupled with the optical fiber waveguide so as to form a laser cavity with the optical fiber waveguide;

means for initiating laser oscillation with laser radiation in a clockwise and a counterclockwise direction through the single optical fiber waveguide;

means for removing a portion of each of the clockwise and counterclockwise laser radiation from the optical fiber waveguide comprising an imperfect splice in the optical fiber waveguide, the imperfect splice deflecting a portion of each of the clockwise and counterclockwise laser radiation from the optical fiber waveguide;

means for combining the removed laser radiation; and

means for detecting differences between the clockwise and counterclockwise laser radiation, the difference being a function of the rotation of the area, said means for detecting comprising a beat frequency detector.

4,013,366

METHOD AND APPARATUS FOR INVESTIGATION OF SMALL DISPLACEMENTS OF A SOLID BODY BY MEANS OF COHERENT LIGHT

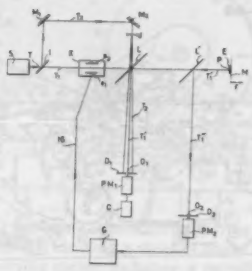
Michel Eric Philbert, Paris, France, assignor to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France

Continuation-in-part of Ser. No. 467,074, May 6, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 606,324

Claims priority, application France, May 23, 1973, 73.18751

Int. Cl.² G01B *9/02*

U.S. Cl. 356—106 R **5 Claims**



1. A method for monitoring the vibrating displacements of a light diffusing solid body comprising, producing interference between part of a laser beam diffused by said body and another part of said laser beam, and controlling the intensity of the laser beam with a part of the laser beam diffused by said solid body in order to avoid the speckled image from said solid body produced by the diffused laser beam.

4,013,367

APPARATUS FOR DETECTING IRREGULARITIES IN THE SURFACES OF MATERIALS

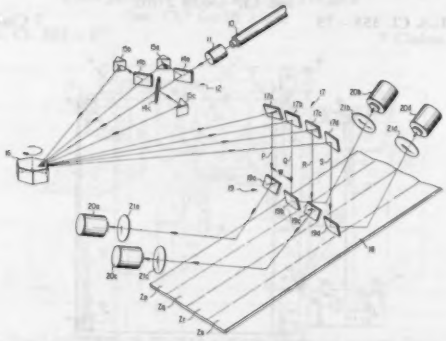
Yukio Nagao, Yamato, and Masayoshi Shimada, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed May 13, 1975, Ser. No. 577,032

Claims priority, application Japan, May 13, 1974, 49-52271

Int. Cl.² G01N *21/32*

U.S. Cl. 356—200 **8 Claims**



1. An apparatus, for detecting irregularities in the surface of a material which is in relative motion with respect to said apparatus and which has a plurality of adjacent, virtual zones defined thereon, comprising:

means including a light source for producing a light beam,

dividing means for dividing said light beam from said light source into several fine light beams and for conducting said divided beams to a scanning means;

scanning means for receiving said light beams from said dividing means and for scanning said light beams substantially perpendicularly to the direction of motion of said material across scanning zones of predetermined width defined on said surface of said material by said scanning means, the scanning zones defined upon adjacent virtual zones being respectively spaced apart from one another; and

detecting means for receiving said light beams from said scanning means subsequent to its reflection from said surface of said material, said detecting means providing an indication of said surface irregularities.

4,013,368

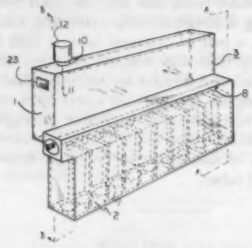
SAMPLE CARTRIDGE FOR USE IN APPARATUS FOR EVALUATION OF BIOLOGICAL FLUID

Jesse L. Acker, Rockaway, N.J., and Peter M. Meserol, E. Northport, N.Y., assignors to Akro-Medic Engineering, Inc., Denville, N.J.

Division of Ser. No. 290,654, Sept. 20, 1972, Pat. No. 3,837,745. This application Aug. 23, 1974, Ser. No. 500,166

Int. Cl.² G01N *1/10*

U.S. Cl. 356—246 **8 Claims**



5. A self-contained cartridge of unitary construction comprising:

a. a plurality of cuvettes,

b. a first chamber for fluid mounted above said cuvettes,

c. a second chamber mounted above said cuvettes adjacent said first chamber and substantially coextensive therewith,

d. means intermediate said first chamber and said cuvettes for permitting the flow of fluid from said first chamber into said cuvettes, and,

e. gas permeable means disposed intermediate said second chamber and said cuvettes to permit the gases present in said cuvettes to escape therefrom into said second chamber when the fluid passes from said first chamber into said cuvettes.

4,013,369

SPRAYER-WIPER DEVICE

Alice Turek, 1715 Illinois Road, Northbrook, Ill. 60062

Filed Nov. 7, 1975, Ser. No. 630,040

Int. Cl.² A47L *13/26*

U.S. Cl. 401—139 **5 Claims**

1. A fluid dispensing-wiper device for contacting and subsequently cleaning and drying an object, said device comprising:

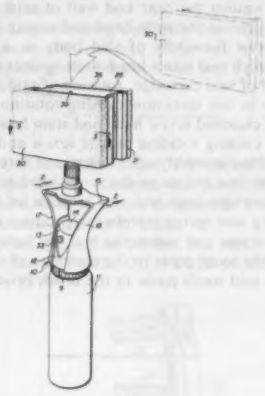
a container for holding fluid;

means for dispensing fluid from said container onto an object, said dispensing means being removably connected to said container;

a single bracket means comprising a base and two resilient leg members depending from said base and biased toward each other;

said base being spaced above said dispensing means;

said resilient bracket leg members each including a lug means at the outboard end of said leg and said container and dispensing means having a recess formed therebetween to receive said lugs whereby said lugs are positioned in said recess and said bracket is retained in a biased position in said container solely by said leg members and lug means.



4,013,370

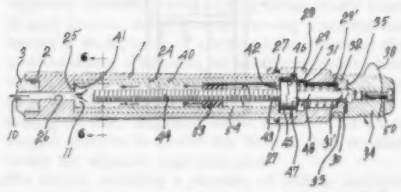
FOUNTAIN TOOTH-BRUSH

Antoine Gingras, 3705 St. Joseph Boulevard, East - Apt., Montreal, Quebec, Canada

Filed Dec. 1, 1975, Ser. No. 636,618

Int. Cl.² A46B *11/02*

U.S. Cl. 401—175 **5 Claims**



1. A fountain type tooth-brush comprising an elongated hollow body forming a handle and open at its rear end, a tooth paste containing cartridge removably and non-rotatably located within said hollow body, a stem carried by the forward end of said body and carrying a tooth-brush head and tooth-brush bristles at the forward end thereof, said stem and tooth-brush head having a tooth paste passage opening within said tooth-brush bristles and in communication with the interior of said cartridge in said body for the supply of tooth paste from said cartridge to said brush bristles, said cartridge having a rear end wall, a piston longitudinally displaceable within said cartridge and non-rotatably mounted therein, a screw threaded within said piston, freely extending through a hole of said cartridge rear end wall and having a head secured to the end portion of said screw protruding rearwardly of said cartridge rear end wall, a cap removably secured to the rear end of said body and freely enclosing said head, a stem coaxial with said screw, extending within said cap, said cap having a rear end portion provided with a guiding hole, said stem axially displaceable and rotatable within said guiding hole of the rear end of said cap, said stem protruding rearwardly of said cap, an operating knob secured to the protruding rear end

portion of said stem, said stem having at its forward end a head located within said cap and in clutching and removable engagement with the screw head, a compression spring member disposed within said cap surrounding said stem and abutting at its rear end against the rear end wall of said cap and at its forward end against the stem head and urging the stem, stem head and screw forwardly of said body to a forward limit position in which said screw head abuts against the back of the rear end wall of said cartridge, rotation of said stem by means of said knob in one direction causing rotation of said screw through said clutched screw head and stem head in one direction, in turn causing rotation of said screw and rearward displacement of the assembly of the stem and screw to compress the spring member and move the screw head rearwardly away from said cartridge rear end wall, release of said operating knob allowing said spring member to produce forward movement of the screw and piston, such as the latter will produce pressure on the tooth paste in the cartridge ahead of the same to discharge said tooth paste to the brush bristles.

4,013,371

JOINTING DEVICE

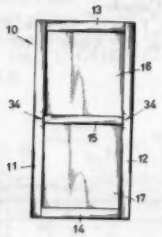
Mitsuo Nagase, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 9, 1975, Ser. No. 620,937

Claims priority, application Japan, Oct. 11, 1974, 49-123445

Int. Cl.² F16B 7/18

U.S. Cl. 403—187 **3 Claims**



1. A T-shaped structural joint, comprising:

a. a horizontal tubular rail having a rectangular hollow cross-section, there being means defining a pair of elongated tapped sockets whose thread axis extends parallel to the length of said horizontal rail and said means being integral therewith at its upper and lower narrower interior surfaces;

b. a vertical tubular member having a rectangular hollow cross-section, there being a pair of flanges extending along opposite edges of and perpendicularly to one of the narrow sides of said vertical members, there being a pair of tapped holes in said one side of said member spaced apart by a distance greater than the vertical height of said rail, and disposed at an intermediate location along the height of said member;

c. a strip having a surface, which is flat throughout the extent of such strip, disposed flatwise against said one side of said member between said flanges and having apertures in registration with said tapped holes, said tubular rail engaging the opposite surface of said strip between said apertures, said strip having further apertures in registration with said tapped sockets; and

d. screws passing through said strip into said tapped holes and said tapped sockets.

4,013,372

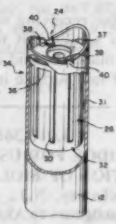
TUBING CONNECTION

Ralph B. Lay, and Donald L. Moore, both of Columbus, Ind., assignors to Cosco, Inc., Columbus, Ind.

Filed June 18, 1975, Ser. No. 587,809

Int. Cl.² F16B 12/40

U.S. Cl. 403—237 **9 Claims**



1. A tubing connection for an article of furniture comprising a first tube having an open end and a second tube, the open end of said first tube being arcuately recessed for mating engagement with the external surface of said second tube; a cylindrical insert for reception into the open end of said first tube and having a longitudinally extending central opening formed therein; a pair of opposed tabs on said first tube extending inwardly from the deepest portions of the arcuate recess at the open end thereof for retaining said insert within said first tube and for spacing said insert from the end of said first tube; and screw means receivable through an opening formed in said second tube and threadably receivable into the central opening of said insert to bindingly interconnect said first and second tubes.

4,013,373

SNAP-RING-CONNECTED COAXIAL ANNULAR MEMBERS

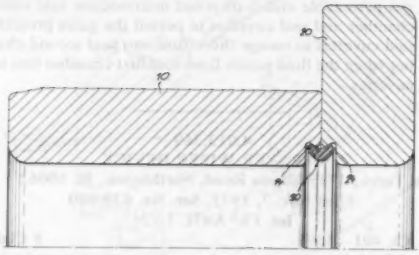
Horst Lamprecht, Oberwerrn, and Georg Welsch, Grafenrheinfeld, both of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Sept. 12, 1975, Ser. No. 612,802

Claims priority, application Germany, Sept. 13, 1974, 2443918

Int. Cl.² F16D 1/00; F16G 11/00

U.S. Cl. 403—291 **10 Claims**



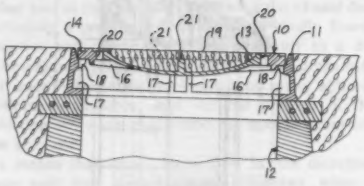
5. In combination, a pair of coaxial annular members and an elastically deformable continuous connecting ring detachably holding said members together, said members being provided along adjoining faces thereof with confronting inner peripheral grooves bounded by tapering rims, the generatrices of each rim converging in a direction away from the respective groove bottom, said ring having an outer peripheral suface of double-frustoconical configuration defining a pair of lips diverging from a midplane at an angle equaling the angle of convergence of said rims, said lips being matingly received in

said grooves with said outer peripheral surface resting against said rim.

4,013,374
COVER FOR MANHOLE STRUCTURES

Walter K. F. Weiler, Diez, and Rudolf C. Passavant, Aarbergen, both of Germany, assignors to Passavant-Werke Michelbacher Hutte, Germany

Filed Oct. 16, 1975, Ser. No. 622,909
Int. Cl.² E02D *29/08*
U.S. Cl. 404—25 **7 Claims**

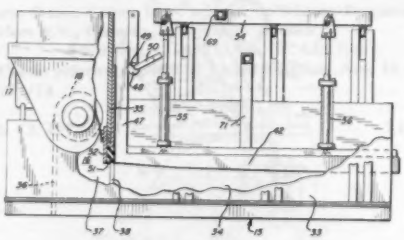


1. In a cover for manhole structures,
a. a metal portion constructed and arranged of high strength material providing maximum strength with a minimum of weight, and
b. a concrete portion carried by said metal portion with the specific gravity of said concrete portion exceeding the specific gravity of conventional concrete and being so proportioned relative to the weight of said metal portion that the combined weights of said metal portion and said concrete portion provide a manhole cover of a predetermined minimum weight.

4,013,375
CURB FORMING MACHINE

Blaine Heaton, 411 Keith Ave., Crystal Lake, Ill. 60014

Filed June 30, 1975, Ser. No. 591,458
Int. Cl.² E01C *19/52*
U.S. Cl. 404—98 **7 Claims**

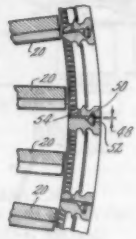


7. In a machine for slip forming a concrete curb on the ground, including a movable carrier for travel across the ground, and a well on the carrier for delivering plastic concrete to a slip form in the rear of the well, the well having a rear wall at the front of the slip form, the improvement comprising:
slip form side walls spaced apart laterally with respect to the direction of carrier movement, said side walls defining the lateral surfaces of the curb and the lower edge of a side wall establishing the grade of the base of the curb, said side walls being open at the bottom to deposit concrete onto the ground;
a slip form top wall between the lateral walls defining the head of the curb;
means connected with the slip form top wall for moving the slip form top wall vertically between and with respect to the side walls to vary the vertical dimension of the formed curb and establish the grade of the head of the curb, the rear wall of said well having an opening into the slip form with a vertical dimension corresponding with the maximum height of the slip form top wall with respect to the side walls; and
a sealing plate extending upwardly from said slip form top wall adjacent the rear wall of the well to block a portion of said opening when the top wall is at a position below its maximum height.

4,013,376
COOLABLE BLADE TIP SHROUD

Bernard Joseph Bisson, Winsted, and Loren Hawdon White, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed June 2, 1975, Ser. No. 583,140
Int. Cl.² F02C *7/18*; **F01D** *25/12*
U.S. Cl. 415—117 **2 Claims**



1. A shroud, which surrounds a portion of the flow path for the working medium gases in the turbine section of a gas turbine engine, comprising:
a plurality of arcuate segments disposed in end to end relationship wherein each arcuate segment has a plurality of lugs which interlock with corresponding lugs from the adjacent segment and wherein each pair of adjacent segments forms therebetween a substantially triangular shaped groove, the segments forming a sealing surface, having a multiplicity of cooling holes disposed therein, and including a plurality of axially adjacent chambers which extend circumferentially beneath the sealing surface;
a sealing member disposed within each of said triangular shaped grooves to inhibit the flow of fluid medium between the adjacent segments; and
baffle means, including a plurality of orifices incorporated therein, which is disposed across one side of each chamber of the arcuate segments, wherein the cooling holes of the sealing surface and orifices of the baffle means are sized and spaced to provide a substantially uniform pressure ratio across the sealing surface during operation of the engine.

4,013,377
INTERMEDIATE TRANSITION ANNULUS FOR A TWO SHAFT GAS TURBINE ENGINE

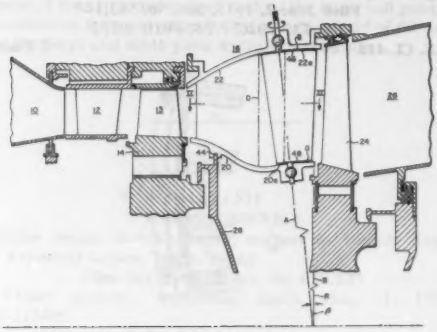
David J. Amos, Nether Providence Township, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 8, 1975, Ser. No. 620,608
Int. Cl.² F01D *17/14*
U.S. Cl. 415—161 **9 Claims**

1. A two shaft gas turbine engine having a closely coupled fluid flow path between the compressor turbine and the power turbine through an annular duct means which comprises:
a plurality of individual arcuate segments comprising:
radially opposed axially extending wall members, the arcuate extent of the upstream and downstream end thereof in conjunction with the radial spacing therebetween defining inlet and outlet areas respectively of said segment;

said wall members diverging radially from the inlet area to a point generally intermediate the axial extent of each said member and continuing from said point to the outlet area in a generally concentric relationship whereby the outlet area is greater than the inlet area of each said segment;

at least one vane extending radially between and interconnecting said wall members, said vane extending axially from adjacent said inlet area to beyond said generally intermediate point and having an ovate longitudinal section defined by the opposite faces of said vane diverging axially from the leading edge of said vane to generally said intermediate point and thence converging to the trailing edge of said vane within the axial extent of said segment;



said ovate shaped vane further defining a camber line from the leading edge to the trailing edge forming a progressively increasing angle with respect to the axis of said engine to effectively progressively reduce the area between adjacent vanes; and,

at least a second vane generally downstream of said one vane and extending radially to adjacent said opposed wall members and axially to adjacent said exit area whereby,

the increase in annular area provided by said diverging wall members is for the most part compensated for by the increase in vane width along a predetermined axial length and then by the reduction of area between adjacent vanes provided by said angular orientation of said camber line to maintain the velocity of the fluid passing through said segment generally constant from said inlet area to at least said second vane.

4,013,378

AXIAL FLOW TURBINE EXHAUST HOOD

Josef Herzog, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,876
Int. Cl.² F01D *1/02*
U.S. Cl. 415—209 **8 Claims**

1. A combined axial flow turbine and exhaust hood comprising:

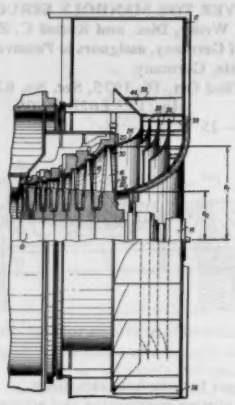
a. an axial flow turbine having last stage buckets adjacent the exhaust from said turbine,

b. an exhaust hood including an exhaust duct having an annular opening connected to said turbine adjacent said last stage buckets, said duct having an inner wall positioned approximately at the root of said last stage buckets and an outer wall positioned approximately at the tip of said last stage buckets, said exhaust duct receiving steam in an axial direction at said annular opening and being curved to direct said steam in a radial direction,

c. a plurality of first curved vanes positioned in spaced relationship in said exhaust duct between said inner and outer walls thereof for directing the steam in a radial direction at the trailing ends of said vanes,

d. a guide ring surrounding said vanes adjacent the trailing ends thereof,

e. a plurality of curved secondary vanes positioned in spaced relationship in said guide ring,



f. said exhaust hood having a radially extending discharge opening,

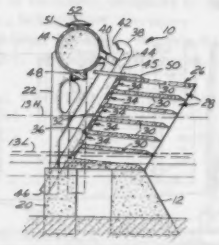
g. said secondary vanes being curved by varying amounts for directing steam from said first vanes toward said discharge opening.

4,013,379

WAVE-POWERED PNEUMATIC SYSTEM FOR POWER GENERATION

Richard D. Bolding, 2005 Stonehurst, Rialto, Calif. 92376

Filed Sept. 26, 1974, Ser. No. 509,333
Int. Cl.² F04B *35/00;* **F04F** *11/00*
U.S. Cl. 417—100 **4 Claims**



1. A wave-powered pneumatic system for producing compressed air to be used for energy storage or power generation, said system comprising, in combination:

a seawall at the edge of the seashore at the point where waves just begin to break, said seawall extending parallel to the shore and having an upwardly and rearwardly inclined surface on the seaward side;

an air-accumulating structure mounted on said seawall and having a plurality of vertically spaced collection chambers, each extending generally parallel to the line of travel of the waves, and each having an entrance opening at the seaward end into which the incoming waves pass, as they reach the said seawall, the inclined seaward face of said seawall acting to direct the waves into the entrances of the collection chambers;

each of said collection chambers having laterally spaced side walls, vertically spaced top and bottom walls, and a rear end wall at the shoreward end of the chamber, said

collection chambers being substantially uniform in cross-sectional area from end to end, and said rear end wall being generally perpendicular to the line of travel of the wave as it moves along the collection chamber;

an exit opening through said rear end wall of each of said collection chambers, said exit opening being a relatively small proportion of the total area of the rear end wall;

a plenum chamber extending parallel to said seawall closely adjacent the shoreward side of said air-accumulating structure;

a plurality of ducts, each connected at one end to said exit opening of one of the collection chambers, and at the other end to said plenum chamber, each of said ducts also including a portion extending downwardly from its respective exit opening into the seawater to a depth of submergence sufficient to seal the conduit against loss of air under compression obtained by wave action in the collection chamber, said vertical portion of the duct allowing any water that enters the duct to drain back into the sea; and

valve means that allows air to flow in one direction only, from said duct to said plenum chamber, when the air pressure within the duct exceeds the air pressure within the plenum chamber, said valve means allowing atmospheric air to enter said duct when the pressure therein falls to subatmospheric pressure as the wave recedes;

said collection chamber receiving the solid mass of water from each wave as the wave moves toward shore and enters said entrance, said solid mass of water filling said chamber and acting as a piston to drive the air trapped in the chamber toward the rear end thereof, compressing the air and forcing it out through said duct to said plenum chamber, said rear end wall providing a barrier against which the wave dashes to expend its remaining energy before receding back into the sea, and only a small amount of water passing through said restricted exit opening into said duct, where it drains into the sea through said vertical duct portion.

4,013,380

CONTROL SYSTEMS FOR VARIABLE CAPACITY HYDRAULIC MACHINES

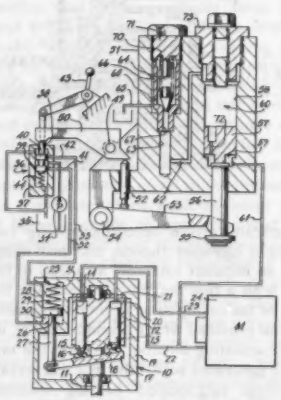
Carlo Pensa, Como, Italy, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Nov. 17, 1975, Ser. No. 632,734

Claims priority, application United Kingdom, Nov. 18, 1974, 49873/74

Int. Cl.² F04B 1/26

U.S. Cl. 417—218 **7 Claims**



1. A variable capacity hydraulic machine having a fluid outlet conduit, adjusting means for varying the capacity of said machine including a fluid pressure source, a servo motor and a valve means to control said servo motor, said valve means connected to said fluid pressure source to receive pressurized fluid therefrom, manual control means operable upon said valve means to cause flow to or from said servo motor, and a control comprising override means operable upon said valve means to cause movement thereof to reduce the capacity of said machine upon fluid pressure in said conduit attaining a predetermined level, actuating means operable upon said override means and including a piston slidable within a cylinder and defining two chambers therein connected by a restrictive passage, one of said chambers being subjected to the pressure of fluid in said outlet conduit and the other of said chambers being connected to a pressure regulator, said pressure regulator operable upon attainment of said predetermined pressure in said other chamber to vent said other chamber and cause said piston to move relative to said cylinder to actuate said override means.

4,013,381

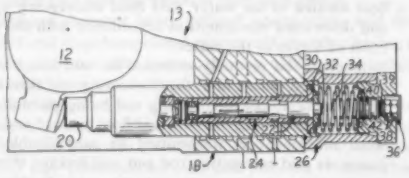
PUMP CONTROL ASSEMBLY HAVING ADJUSTABLE BIASING MEANS

Allyn J. Hein, Camdenton, Mo.; William D. McMillan, Joliet, and Walter Z. Ruseff, New Lenox, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 9, 1976, Ser. No. 656,235

Int. Cl.² F04B 1/26

U.S. Cl. 417—222 **9 Claims**



1. In a pump control assembly for moving a swash plate of a variable displacement pump between maximum and minimum discharge rate positions, said pump having inlet and outlet means, said control assembly having a first means having a movable first actuating means for biasing the swash plate toward one of the maximum or minimum discharge rate positions and a second means having a movable second actuating means for biasing the swash plate toward the other discharge position, said second means having a spool and a sleeve movable within a housing and communicable with a pump discharge pressure signal for biasing the second actuating means, a first biasing means for biasing the sleeve in first direction, and a second biasing means for biasing the spool in the first direction, the improvement comprising:

third biasing means positioned in the pathway of the movable spool for biasing the spool in the first direction, said third biasing means including:

a guide element connected to one of the spools or the position changing means and extending into the third biasing means in the installed position;

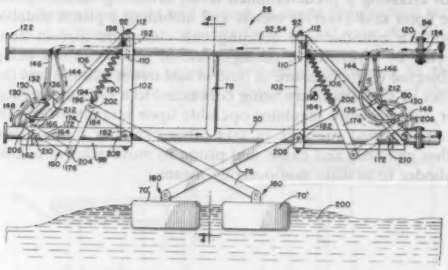
a flange extending from the guide element and into the third biasing means in the installed position for connecting the third biasing means to one of said position changing means or spool; and

means for controllably changing the biasing position of the third biasing means in the pathway of the spool.

4,013,382
WAVE POWER APPARATUS SUPPORTED AND OPERATED BY FLOATS IN WATER

Richard E. Diggs, S. 12A Road, P.O. Box 776, Carthage, Mo. 64836

Filed Oct. 14, 1975, Ser. No. 622,256
Int. Cl.² F04B *17/00*
U.S. Cl. 417—332 **20 Claims**



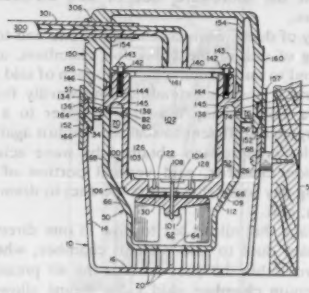
1. An apparatus for converting the movement of waves in a body of water into power, comprising:
   a power station which generates power as a result of fluid flowing therethrough;
   a plurality of frame sections each including a plurality of pipes connected to pipes of adjacent frame sections and to said power station for conducting fluid to and from said power station, a double-acting pump attached to said frame section and fluidly connected to said pipes so that actuation of said double-acting pump causes fluid to be moved through said pipes, and linkage means pivotally mounted on said frame section and connected to said double-acting pump in a manner such that movement of said linkage actuates said double-acting pump;
   a float located in the water, said float undergoing upward and downward movement in accordance with the movement of waves in the water;
   a connecting rod pivotally mounted on said frame section and attached to said float for connecting said float to said frame section, said connecting rod being pivotally connected to said linkage so that said float upward and downward movement is transmitted to said double-acting pump via said connecting rod and said linkage through a mechanical advantage to actuate said double-acting pump; and
   spring means connected to said connecting rod and to said frame so that said frame section is supported by said float and movement of said float in one direction deforms said spring to bias same in a manner such that during movement of said float in an opposite direction, movement of said connecting rod is assisted by said spring so that movement of said linkage by said connecting rod is assisted by said spring whereby said spring assists said connecting rod in actuating said pump via said linkage during movement of said float in said opposite vertical direction.

4,013,383
VERTICAL SHAFT IMPELLER PUMP APPARATUS

Clinton Rule, Beverly Farms, Mass., assignor to Rule Industries, Inc., Gloucester, Mass.

Continuation of Ser. No. 420,933, Dec. 3, 1973, Pat. No. 3,861,831. This application Nov. 29, 1974, Ser. No. 528,029
The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.
Int. Cl.² F04B *17/00, 39/06, 35/04*
U.S. Cl. 417—366 **5 Claims**

1. A vertical shaft impeller pump comprising:
   A. an external enclosure comprising intake means adapted to conduct fluid thereinto;
   B. a separable, generally cup-shaped housing disposed within and spaced apart from said external enclosure and comprising
      i. inlet means adapted to conduct fluid from within said external enclosure into said housing, said inlet means being located at the lower portion of said housing, and
      ii. discharge means adapted to conduct fluid from said housing to the exterior of the pump;

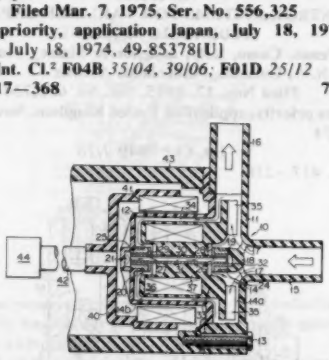


   C. a separable fluid-tight casing disposed within and in spaced relationship with said housing, said spaced relationship defining an impeller chamber below said casing;
   D. a prime mover disposed within said casing, said prime mover comprising a drive shaft extending in substantially fluid-tight relationship through the bottom of said casing and into said impeller chamber; and
   E. an impeller disposed within said impeller chamber and affixed to said drive shaft.

4,013,384
MAGNETICALLY DRIVEN CENTRIFUGAL PUMP AND MEANS PROVIDING COOLING FLUID FLOW

Kunihiro Oikawa, Niiza, Japan, assignor to Iwaki Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1975, Ser. No. 556,325
Claims priority, application Japan, July 18, 1974, 49-85377[U]; July 18, 1974, 49-85378[U]
Int. Cl.² F04B *35/04, 39/06;* **F01D** *25/12*
U.S. Cl. 417—368 **7 Claims**



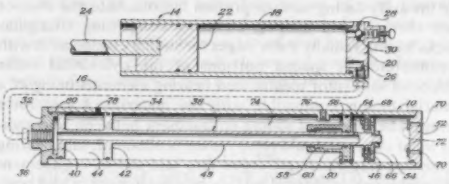
1. A magnetically driven centrifugal pump comprising a casing defining a chamber therein and providing inlet and outlet means, an impeller rotatably arranged in the chamber and provided with a first magnet, an actuating member disposed outside of the casing so as to rotate concentrically with the impeller and provided with a second magnet, drive means for driving the actuating member to rotate the impeller by a magnetic force generated across the first and second magnets, first and second ring-shaped bearing members fixedly mounted on the inner wall of the casing behind and in front of the impeller, respectively, and a supporting shaft having a longitudinal hole extending therethrough and rotatably supported at its rear and front end portions on the inner periph-

eral walls of (by) said first and second bearing members, respectively, said impeller being fixed to the supporting shaft at a portion behind the front end portion thereof, said first and second bearing members respectively having first and second axial grooves in their inner peripheral walls (bearing surfaces), said first (and second) axial grooves communicating with the rear terminal opening (openings) of said longitudinal hole, (respectively.) said supporting shaft having at its front terminal surface at least one pumping groove which extends from the inner peripheral wall of the shaft to the outer peripheral wall thereof and has an opening opened at said outer peripheral wall, (connects the longitudinal hole of the shaft to the second axial groove of the second bearing member) the outer peripheral wall of the front end portion of the shaft being surrounded with the inner peripheral wall of the second bearing member so that, upon rotation of the shaft, the opening of the pumping groove intermittently communicates with the second axial grooves and means providing fluid communication between the outlet of the centrifugal pump and the first axial grooves.

4,013,385
DEEP WELL PUMP SYSTEM

Fred M. Peterson, 3232 Shawnee Trail, Fort Worth, Tex. 76135

Filed June 6, 1975, Ser. No. 584,484
Int. Cl.² F04B 17/00
U.S. Cl. 417—377 **2 Claims**

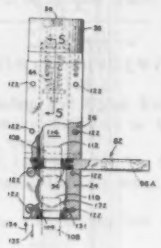


1. In a surface pressure activated deep well pump system, a sub-surface pump unit and a surface power unit, a fluid delivery passage between the pump unit and the power unit, the depth of the pump unit defining a predetermined fluid column within the fluid delivery passage upward from the pump unit, said pump unit comprising a housing including an activating chamber, a discharge port communicating the activating chamber with the fluid delivery passage, a charge piston defining a wall of said activating chamber, said charge piston being slideably movable between a full discharge position and a full charge position, a valve intake through the housing, a working chamber within said housing remote from the activating chamber and in communication with the intake, a working piston sildeably disposed within said working chamber for a selective inward drawing of fluid through said intake and a selective discharge of fluid through said discharge port, means interconnecting the charge piston and the working piston for synchronized movement, a collapsible volume chamber resiliently retaining said charge piston in the full discharge position, said collapsible volume chamber developing a resistance to movement approximately equal to the pressure of the fluid column plus a predetermined fluid discharge pressure, said power unit being operable to pressurize said fluid column above the predetermined fluid discharge pressure to collapse the collapsible volume chamber and effect a fluid trapping movement of the working piston, said power unit being subsequently operable to reduce pressure on the fluid column below the predetermined fluid discharge pressure to allow an expansion of the collapsible volume chamber and a discharge of fluid trapped by the working piston; a sealing chamber containing a liquid barrier disposed intermediate a pair of seal means at the respective ends of said collapsible volume chamber at which there is relative reciprocal motion for preventing entry of abrasive materials into said collapsible volume chamber.

4,013,386
POSITIVE DISPLACEMENT METERING PUMP

James V. Hardman, N. Caldwell, and Norman S. Wolfman, Cranford, both of N.J., assignors to Hardman Incorporated, Belleville, N.J.

Filed Sept. 8, 1975, Ser. No. 611,507
Int. Cl.² F04B 7/04
U.S. Cl. 417—489 **14 Claims**



1. A metering pump for pumping quantities of a flowable liquid composition, comprising in combination:

a pump body including a bore for receiving said composition to be dispensed;

feed inlet means for providing said flowable composition to said bore;

a dispensing outlet means including check valve means for discharging said composition from said pump;

a pressure chamber being defined intermediate said feed inlet and dispensing outlet means; said chamber having an inlet, and an outlet communicating with said dispensing outlet through said check valve means;

a piston mounted for axial reciprocation in said bore between a first position whereat said piston is withdrawn from said pressure chamber inlet and whereat said feed inlet may communicate with said pressure chamber inlet to enable feed of said composition to said pressure chamber inlet, and a second position whereat said piston passes at least partially into said pressure chamber inlet;

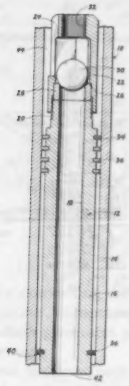
said pressure chamber inlet being bounded by first sealing means including an annular sealing surface which converges in the direction of said pressure chamber for substantially its entire extension along the axis of said bore to a diameter less than that of said piston, whereby said surface may slideingly engage and seal with said piston upon said piston entering said pressure chamber; said sealing surface being elastically dilateable away from the axis of said bore to maintain the seal about said piston during entry and withdrawal from said pressure chamber and to compensate for wear; and at least one other surface of said sealing means being accessible to the interior of said pressure chamber, and elastically coupled to the backside of said sealing surface, whereby the increasing pressure developed by continued axial movement of said piston into said pressure chamber, acting through said accessible surface, increases sealing force between said sealing surface and piston;

and wherein said piston comprises a cylindrically shaped rod of generally uniform cross-section; the diameter of said rod being substantially less than that of said bore, to provide substantial clearance between said piston and the internal wall of said bore.

4,013,387
OIL WELL PUMP

Lonnie L. Gage, Rte. 3, Walters, Okla. 73572

Continuation of Ser. No. 264,786, June 21, 1972, abandoned.
This application Jan. 2, 1974, Ser. No. 429,546
Int. Cl.² F04B 21/04
U.S. Cl. 417—554 5 Claims



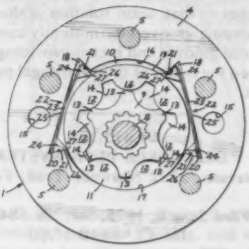
1. A subsurface well pump comprising a first elongated stationary tubular member in communication with the well fluid reservoir, a second elongated tubular member in communication with the well fluid and concentrically arranged with respect to the stationary tubular member and reciprocal with respect thereto, valve means carried by one of said tubular members to provide alternate open and closed positions for the pump during operation thereof, and piston ring means provided on the outer periphery of one of said tubular members and engagable with the inner periphery of the other of said tubular members for precluding bypassing of the well fluid between the tubular members during operation of the pump, said piston ring means comprising at least one annular groove provided around the outer periphery of said one tubular member, at least one relatively thi metallic piston ring disposed in said groove, said ring having an internal bore concentric with the outer circumference thereof and being constantly urged in an outwardly radial direction for sealing engagement with the inner periphery of the said other tubular member, and wherein a slight clearance is provided between the internal bore of said piston ring and the bottom of each annular groove, a portion of said well fluid being trapped in said clearance to facilitating maintaining of said ring concentric with said groove and increase the sealing engagement of the ring and said other tubular member.

4,013,388
SUPPORT MEANS FOR FLOATING ROTARY RING MEMBER

Paul E. Stratman, Minneapolis, Minn., assignor to Safe Way Hydraulics, Inc., Minneapolis, Minn.

Filed Oct. 6, 1975, Ser. No. 619,563
Int. Cl.² F04C 1/06
U.S. Cl. 418—108 2 Claims

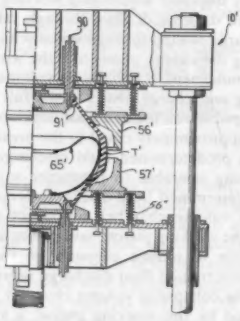
1. A rotary fluid displacement device comprising a housing defining a rotor chamber having a peripheral wall defining a pair of diametrically opposed arcuate wall surfaces and a pair of circumferentially spaced radially inwardly opening recesses between said arcuate wall surfaces, said recesses each having a radially inwardly facing surface portion and opposite end surfaces angularly displaced from the inwardly facing surface portion thereof and extending generally radially inwardly toward said arcuate surfaces; rotor means in said chamber having a cylindrical outer surface, said arcuate wall surfaces having a diameter greater than that of the outer cylindrical wall surface of said rotor means to provide greater than normal running clearance between said arcuate wall surfaces and said rotor means; characterized by a pair of mounting members each disposed in a different one of said recesses and each including an elongated body portion of flexible resilient material and a pair of generally radially inwardly projecting bearing elements secured to opposite ends of the body portion; one of said portions of each recess and its respective mounting member being longitudinally flat and the other thereof being curved so that each body portion engages its respective radially inwardly facing surface portion intermediate the ends of each thereof; said bearing elements comprising triangular blocks having radially inner edges for sliding engagement with circumferentially spaced portions of the cylindrical outer surface of said rotor means; said bearing elements being of a material that is compatible with the material of said rotor means, whereby good sliding engagement between said radially inner edges and said rotor means is obtained; said bearing elements being yieldingly urged into said sliding engagement with said outer cylindrical surface by engagement of said body portions with said inwardly facing recess surfaces, said bearing elements having flat outer end surfaces arranged for sliding engagement with the end surface of their respective recesses.



4,013,389
RETREAD MOLD INCLUDING MATRIX BIASING MEANS

Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204

Division of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application Dec. 4, 1975, Ser. No. 637,690
Int. Cl.² B29H 5/04
U.S. Cl. 425—21 4 Claims



1. A retread mold comprising a pair of relatively movable platens, means for imparting relative motion to said platens to move the same between a first spaced position and a second more adjacent position, a pair of relatively movable bead

aligner wheels, a first of said bead aligner wheels beng carried by a first of said pair of platens, a second of said bead aligner wheels being carried by a second of said pair of platens, means for imparting relative motion to said bead aligner wheels to move the same between a first spaced position at which said platens are in their first position and a second more adjacent position at which said platens are in their second position, first and second matrices movably carried by said first and second platens, respectively, said matrices defining an annular curing chamber in the second position of said platens, said bead aligner wheels being in axial alignment and being disposed radially inboard of said matrices, first and second biasing means between each first platen and first matrix and each second platen and second matrix, respectively, for biasingly urging the first and second matrices toward each other though in axially spaced relationship in the first position of said platens, said spaced relationship being reducible in opposition to the forces of said first and second biasing means upon movement of said platens to the second position thereof thereby defining said annular chamber, an annular bladder having first and second marginal edge portions adapted to rest upon said first and second bead aligner wheels, respectively, said annular bladder being adapted for insertion into a tire adapted to be cured in said annular chamber, first and second mechanical means for gripping first and second beads of a tire to said first and second bead aligner wheels, respectively, at least when said platens and bead aligner wheels are in their first positions whereby the tire is radially foreshortened, and means for controlling the motion imparting means of said platens to move the same to their second position to form said annular chamber prior to the movement of said bead aligner wheels from their first position to their second position whereby the radially foreshortened tire is returned to its normal condition within said annular chamber.

4,013,390
VULCANIZING MOLD FOR PNEUMATIC VEHICLE TIRES

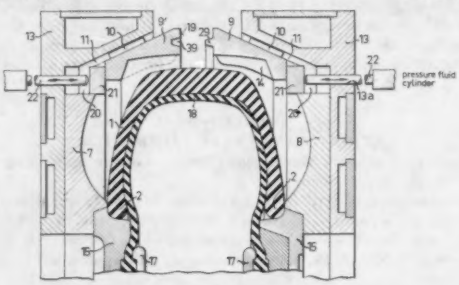
Heinz J. Moeller, Apelern, and Heinz Jagau, Berenbostel, both of Germany, assignors to Continental Gummi-Werke Aktiengeselischaft, Hannover, Germany

Filed Jan. 19, 1976, Ser. No. 650,075

Claims priority, application Germany, Jan. 21, 1975, 2502185

Int. Cl.² B29H *5/08*

U.S. Cl. 425—47 **6 Claims**



1. A vulcanizing mold for pneumatic vehicle tires, which includes in combination: a first mold ring, a second mold ring arranged opposite said first mold ring, said mold rings being operable to receive therebetween a raw tire to be molded and to mold the side walls thereof, said first and second mold rings being selectively movable relative toward and away from each other, a first and a second rigid pressure ring respectively slidably surrounding said first and second mold rings and being guidingly engaged thereby, a first set of segments associated with and engageable by first pressure ring and distributed over the circumference of said first mold ring, a second set of segments associated with and engageable by said second pressure ring and distributed over said second mold ring, power operable means respectively associated with said first and second mold rings and operable through the intervention of said pressure rings to move said sets of segments toward each other in the axial direction of said pressure rings, and combined holding and guiding ring means respectively surrounding said first and second sets of segments and movable toward each other for simultaneously guiding the respective pertaining segments in common in the axial direction of said pressure ring means and in a direction transverse to the axial direction of said pressure ring means for molding the tread surface of a raw tire to be molded in said mold.

4,013,391
MIXING APPARATUS COMBINED WITH A MOLDING TOOL

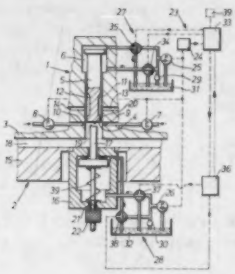
Heinrich Boden, Opladen, and Ulrich Knipp, Schildgen-Nittum, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 14, 1975, Ser. No. 558,515

Claims priority, application Germany, Mar. 20, 1974, 2413337

Int. Cl.² B29D *27/00*

U.S. Cl. 425—145 **16 Claims**



1. A mixing apparatus combined with a molding tool for filling a mold cavity with a foamable reaction mixture of chemical components, the mixing apparatus comprising a mixing chamber into which injection apertures open and in which an ejector piston is displaceable, and from which an outlet aperture of the mixing chamber opens into the mold cavity, characterized in that a displacement piston adapted to move into the mixing chamber is arranged in that wall of the molding tool which faces the outlet aperture of the mixing chamber, the diameter of said displacement piston being smaller than the diameter of the mixing chamber.

4,013,392
INJECTION MOULDING MACHINES

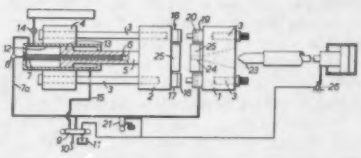
Samuel Charles Henry Smith, Surbiton, England, assignor to G.K.N. Windsor Limited, Surrey, England

Filed May 3, 1974, Ser. No. 466,836

Claims priority, application United Kingdom, May 8, 1973, 21992/73

Int. Cl.² B29C *3/06;* **B29F** *1/06*

U.S. Cl. 425—157 **3 Claims**



1. An injection moulding machine comprising:
a first platen carrying a first mould tool;

a second platen carrying a second mould tool;

means associated with the first platen for moving the first platen towards the second platen to bring the first mould tool into engagement with the second mould tool, said moving means comprising a first piston and cylinder assembly having a first effective area and a second cylinder and piston assembly having a second effective area, greater than said first effective area, the cylinder of said first cylinder and piston assembly being fast with the piston of said second cylinder and piston assembly and the piston of said first cylinder and piston assembly being fast with the cylinder of said second cylinder and piston assembly;

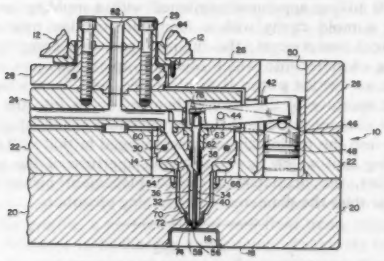
stop means mounted in the path of said first platen and comprising cylinder and piston means placeable in a first condition to define a limit to the relative approach movement of said mould tools and in a second condition to permit said mould tools to move into engagement, said stop means having a third effective area which is smaller than said second effective area and greater than first effective area; and

control means connected to said cause fluid to be supplied to said first cylinder and piston assembly and to said cylinder and piston means of said stop means to move said mould tools to their limited position, to subsequently cause material to be injected between said mould tools, and to thereafter cause fluid to be supplied to said second cylinder and piston assembly and released from the cylinder of said stop means to move said mould tools into engagement.

4,013,393
VALVE-GATED INJECTION MOLDING MECHANISM

Jobst Ulrich Gellert, 11 Newton Road, Brampton, Ontario, Canada

Filed Feb. 4, 1976, Ser. No. 655,057
Claims priority, application Canada, Apr. 10, 1975, 224366
Int. Cl.² B29F *1/05*
U.S. Cl. 425—245 R **3 Claims**

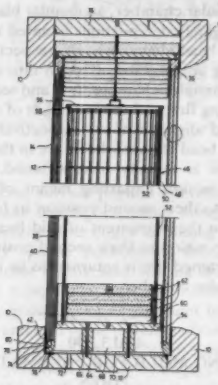


1. In an injection molding valve-gated mechanism having a vertical valve pin which reciprocates in a passage bore in a heater located in a mold to control flow of molten plastic from a molding machine to a cavity, the heater having a lower nozzle portion which is separated from the surrounding mold by an air space and through which the valve pin projects to provide a valve in a gate to the cavity, the valve pin being reciprocated by an air operated piston through a pivoted rocker arm having first and second ends, the improvement wherein the valve pin has a linear peak to provide a first bearing ridge extending transversely to the longitudinal axis of the rocker and has an upper end portion with flat opposite sides which is matingly received in a channel in the underside of the first end of the rocker arm to prevent rotation of the valve pin relative to the rocker arm during use, a first planar bearing surface on the first end of the rocker that cooperates with said first bearing ridge, the piston has a linear peak portion to provide a second bearing ridge extending transversely to the longitudinal axis of the rocker which extends between a pair of upwardly projecting side portions of said piston to receive parallel surfaces of the periphery of the second end of the rocker arm in bearing contact thereon, a second planar bearing surface on the second end of said rocker that cooperates with said second bearing ridge, the side portions preventing rotation of the piston relative to the rocker arm during use.

4,013,394
HOT ISOSTATIC PRESS SYSTEM

Donald E. Witkin, and Arnold G. Bowles, both of Warren, Pa., assignors to National Forge Company, Irvine, Pa.

Filed Aug. 18, 1975, Ser. No. 605,416
Claims priority, application Japan, Aug. 19, 1974, 49-94876
Int. Cl.² B29C *3/00;* **B22F** *3/00*
U.S. Cl. 425—405 H **19 Claims**



1. A hot isostatic press system comprising a substantially cylindrical vessel, a top cover assembly for closing a top end of the vessel, a bottom cover assembly for closing a bottom end of the vessel, a heat insulating sheath positioned within said vessel defining a furnace chamber, a heating element for heating said chamber, a plurality of elongated tubes circumferentially spaced in the heat insulating sheath, a first end of each tube being connected to a source of high pressure gas, and a second end of each tube opening to a top portion of said sheath and in communication with the furnace chamber.

4,013,395
AERODYNAMIC FUEL COMBUSTOR

Alex F. Wormser, Marblehead, Mass., assignor to Wingaersheek, Inc., Peabody, Mass.

Continuation of Ser. No. 142,402, May 11, 1971, abandoned, which is a continuation of Ser. No. 728,933, May 14, 1968, abandoned, which is a continuation-in-part of Ser. No. 535,215, March 17, 1966, abandoned. This application Aug. 23, 1973, Ser. No. 390,792
Int. Cl.² F23D *13/30*
U.S. Cl. 431—9 **27 Claims**

1. A fuel burner which comprises:

a mixing chamber,

said mixing chamber including means for introduction thereinto of combustible material and combustion-supporting gas material and for mixture of the same therein to produce a combustible mixture, and including a downstream mixing chamber outlet,

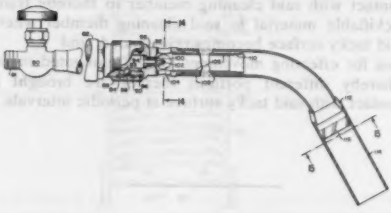
a combustion chamber,

said combustion chamber including a combustion chamber inlet and a combustion chamber outlet, and

a flameholder,

said flameholder being positioned between said mixing chamber outlet and said combustion chamber inlet and including a hub, a plurality of vanes extending outwardly from said hub, and enclosure means for cooperation with said vanes in defining a corresponding plurality of separated passages through said flameholder,

said vanes including mixture guidance surfaces at an angle to the direction of net fluid flow through said flameholder from said mixing chamber to said combustion chamber, to produce a whirling motion in said mixture,



said vanes including also downstream end bluff body means for producing eddying of said mixture thereat, said eddying being of amount effective, in conjunction with said whirling motion, to hold separate flames at respective separate said vanes, thus producing a visible blue whirling flame pattern,

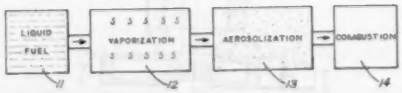
said combustion chamber having an inner surface for confining and guiding burning mixture and efficient delivery, for then doing work, of hot gas through said combustion chamber outlet, and said combustion chamber outlet being open.

4,013,396

FUEL AEROSOLIZATION APPARATUS AND METHOD

William L. Tenney, Crystal Bay, Minn. 55323

Filed Aug. 25, 1975, Ser. No. 607,716
Int. Cl.² F23D *11/44*
U.S. Cl. 431—11 **41 Claims**



1. A method of burning combustible fuel comprising: providing a supply of liquid fuel, vaporizing the liquid fuel to change the fuel from a liquid phase to a vapor phase, condensing the fuel from the vapor phase to aerosol fuel by rapid mixing of air with the vapor phase fuel to form aerosol fuel particles, the majority of said aerosol fuel particles having a particle size of less than 1 micron in diameter, and burning the aerosol fuel particles in air.

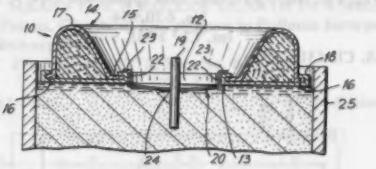
4,013,397

COMBUSTION APPARATUS

Fernando M. Neugart, 32-21 37th St., Astoria, N.Y. 11102

Filed Dec. 5, 1975, Ser. No. 637,872
Int. Cl.² F23D *3/16, 3/24*
U.S. Cl. 431—291 **6 Claims**

1. A combustion apparatus for use with a fuel such as a low temperature, meltable, solid fuel, comprising in combination, a conductor plate formed of metal and having a high thermal conductivity factor, said plate including a central aperture extending transversely therethrough, said plate including a substantially flat bottom portion, an outer perimeter portion, and an integral heat collector rim extending upwardly from the upper surface of said plate surrounding said aperture, wick means extending through said aperture and including an upper end in adjacent proximate open spaced relation to said heat collector rim and said plate bottom and a lower end disposed beneath said bottom surface of said plate, wick holder means mounted in said aperture of said conductor plate for holding said wick means, and a centrally apertured cover plate mem-



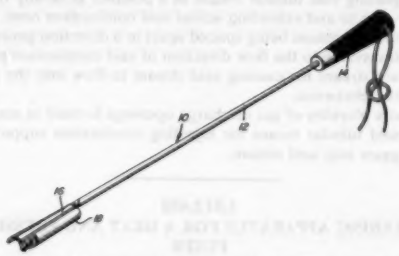
ber, means securing said cover plate member to said conductor plate in overlying relation to the upper surface of said conductor plate with the aperture of said cover plate surrounding said rim, portions of the under surface of said cover plate being spaced from the upper surface of said conductor plate, thereby to form a closed hollow insulating compartment between said plates.

4,013,398

FIREPLACE LIGHTER

Henry E. Hendrix, 3404 S. 28th St., Fort Smith, Ark. 72901

Filed Aug. 11, 1975, Ser. No. 603,335
Int. Cl.² F23Q *2/00, 21/00*
U.S. Cl. 431—344 **3 Claims**

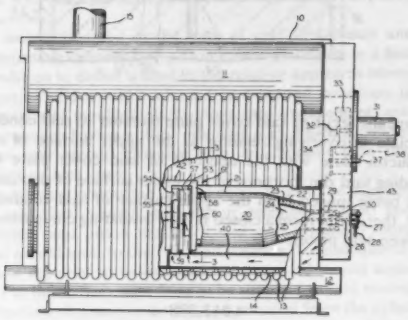


1. An extension-type lighter including an elongated generally longitudinally straight shank, means on one end portion of said shank defining a handgrip, support means on the other end portion of said shank including a generally cylindrical sleeve member open at its opposite ends, disposed along said and extending along said shank with one end of said sleeve member opening endwise outwardly of said other end portion of said shank and defining a socket in which to removably telescopically receive a cigarette lighter, said sleeve member including a full length longitudinal slot formed therein opening through the opposite ends of said sleeve member, said sleeve member being constructed of resilient material and at least slightly expandable, the side of said sleeve member remote from said slot extending along and being secured to said other end portion of said shank, a cigarette lighter having a generally cylindrical body including ignition and fuel outlet means at one end thereof, the other end of said body being removably telescoped into and clamped within said one end of said sleeve member with said ignition and fuel outlet means disposed outwardly of said one end of said sleeve member, said other end portion of said shank including an elongated extension projecting endwise outwardly of said one end of said sleeve member and beyond said ignition and fuel outlet means.

4,013,399
REDUCTION OF GASEOUS POLLUTANTS IN COMBUSTION FLUE GAS

Glenn D. Craig, Menomonee Falls; David T. Feuling, Milwaukee, both of Wis., and Paul G. LeHaye, Cape Elizabeth, Maine, assignors to Aqua-Chem, Inc., Milwaukee, Wis.

Division of Ser. No. 488,057, July 12, 1974, Pat. No. 3,955,907, which is a division of Ser. No. 295,249, Oct. 5, 1972, Pat. No. 3,837,788. This application Oct. 9, 1975, Ser. No. 620,954
Int. Cl.² F23L 9/00
U.S. Cl. 431—351 29 Claims



1. Apparatus for dispersing combustion supporting gas into the gaseous combustion product stream within a combustion zone of a fuel burning device, said apparatus comprising:

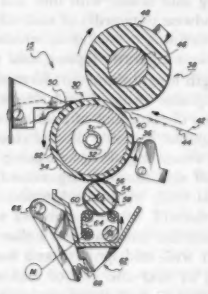
a plurality of elongate, hollow tubular means, means supporting said tubular means in a position generally transverse to and extending across said combustion zone, said tubular means being spaced apart in a direction generally transverse to the flow direction of said combustion product stream for causing said stream to flow into the gaps therebetween,

and a plurality of gas discharge openings formed in each of said tubular means for injecting combustion supporting gases into said stream.

4,013,400
CLEANING APPARATUS FOR A HEAT AND PRESSURE FUSER

Raghulinga R. Thettu, Webster, and Michael J. Oszczakiewicz, Penfield, both of N.J., assignors to Xerox Corporation, Stamford, Conn.

Filed July 21, 1975, Ser. No. 597,734
Int. Cl.² F27D 23/00
U.S. Cl. 432—75 6 Claims



1. Fuser apparatus for fixing toner images to support material, said apparatus comprising:

a pair of nip-forming members between which said support material moves with said toner images contacting a heated one of said nip-forming members;

means for elevating the surface temperature of said heated member to thereby render said toner images tacky;

a cleaning member having a tacky surface, said cleaning member being positioned to contact the surface of said heated one of said nip-forming members;

an elongated member having a coating of tackifiable material thereon;

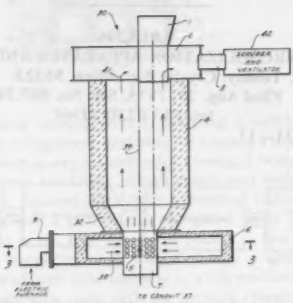
means for stationarily supporting said elongated member in contact with said cleaning member to thereby transfer tackifiable material to said cleaning member whereby said tacky surface becomes rejuvenated; and

means for effecting movement of said elongated member whereby different portions thereof are brought into contact with said tacky surface at periodic intervals.

4,013,401
APPARATUS FOR PREHEATING A RAW MATERIAL CHARGE FOR APPLICATION TO AN ELECTRIC FURNACE

Assen Yordanov Georgiev, and Ivan Vassilev Genev, both of Sofia, Bulgaria, assignors to DSO "Cherna Metalurgia", Sofia, Bulgaria

Filed Sept. 18, 1975, Ser. No. 614,516
Int. Cl.² F27B 3/04
U.S. Cl. 432—164 3 Claims



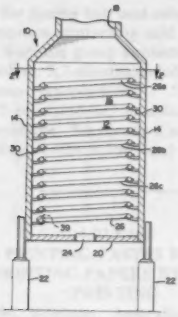
1. In an apparatus for preheating a charge of raw material with hot gases prior to application of the charge to an electric furnace, the apparatus comprising a main charge-holding cylindrical reservoir having a first vertical axis, a cylindrical combustion chamber having a second vertical axis, and conduit means effecting communication between the combustion chamber and the bottom of the main reservoir, the improvement wherein the combustion chamber is disposed below and adjacent the bottom end of the first reservoir with its second axis offset from and parallel to the first axis; wherein the conduit means comprises a vertically disposed transition cylinder extending through the combustion chamber coaxial with the first axis of the main reservoir and communicating at its upper end with the main reservoir, the transition cylinder having a plurality of apertures in its peripheral wall for conducting hot gases from the combustion chamber into the interior of the transition cylinder and thereafter to the lower end of the main reservoir through the upper end of the transition cylinder; and wherein the apparatus further comprises means for coupling the charge in the main reservoir to the furnace through the interior of the transition cylinder.

4,013,402

FIRED HEATER FOR A MULTIPHASE FEEDSTOCK

Eric Klein, Verona, and Ronald Burton Goodman, Parsippany, both of N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed June 11, 1975, Ser. No. 585,895
Int. Cl.² F24H *1/00*; F22B *11/02*
U.S. Cl. 432—223 15 Claims



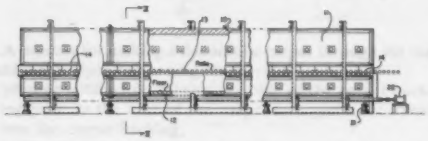
8. A heater for heating a feedstock at least a portion of which is in solid form, comprising a housing; at least one tube disposed in said housing and having an inlet and an outlet for said feedstock, said tube being bent in a manner to form series of contiguous superposed layers, each layer consisting of two substantially parallel straight portions of two curved portions respectively connecting the corresponding ends of said straight portions, each layer occupying a substantial portion of the horizontal cross-sectional area of said housing, means for supporting said tube in said housing; and means associated with said housing for applying heat to said feedstock passing through said tube.

4,013,403

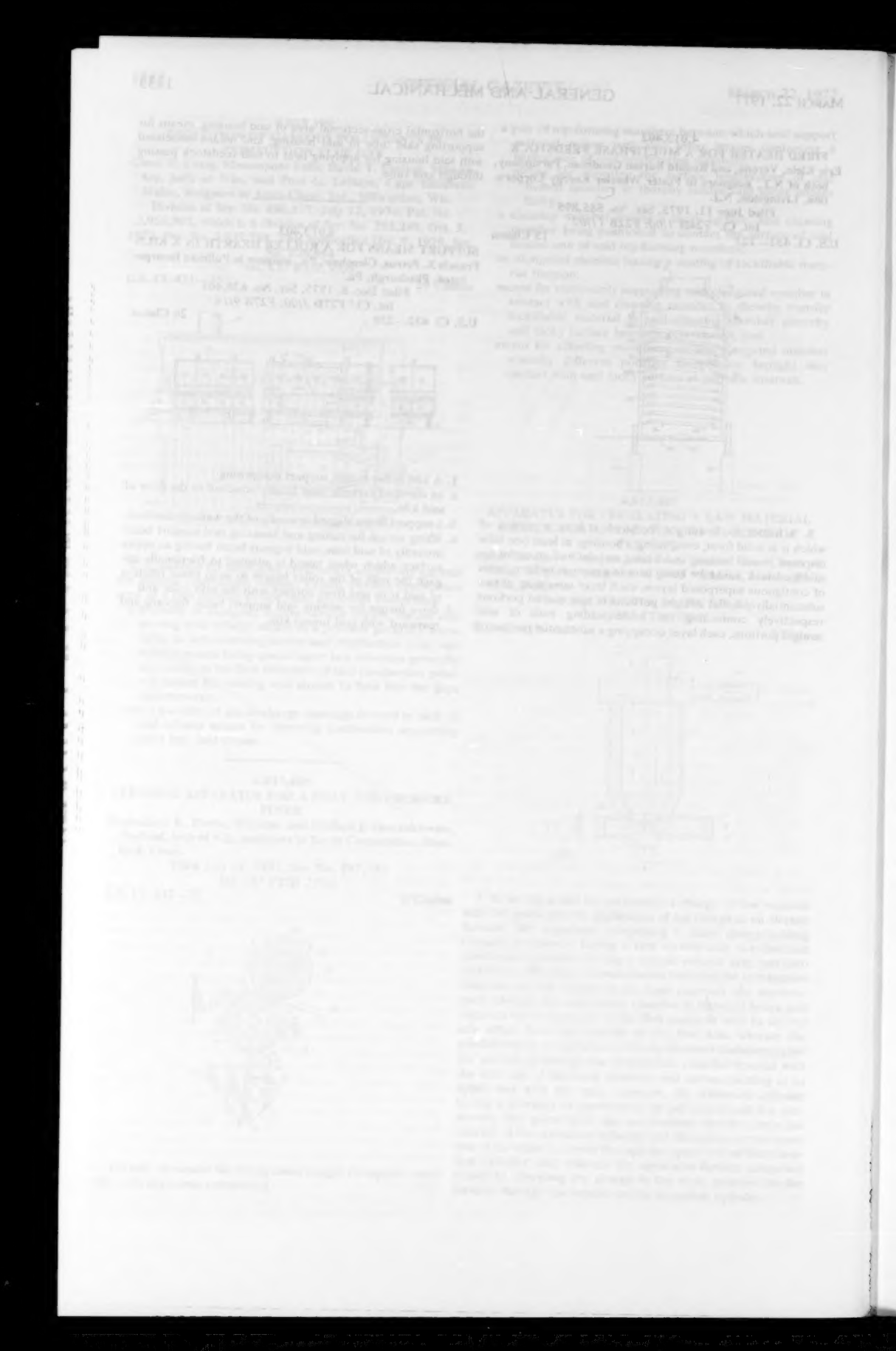
SUPPORT MEANS FOR A ROLLER HEARTH IN A KILN

Francis X. Petrus, Glenshaw, Pa., assignor to Pullman Incorporated, Pittsburgh, Pa.

Filed Dec. 8, 1975, Ser. No. 638,461
Int. Cl.² F27D *3/00*; F27B *9/14*
U.S. Cl. 432—239 26 Claims



1. A kiln roller hearth support comprising:
a. an elevated ceramic base fixably attached to the floor of said kiln,
b. a support beam aligned inwardly of the walls of said base,
c. lifting means for raising and lowering said support beam inwardly of said base, said support beam having an upper surface which when raised is adapted to frictionally engage the rolls of the roller hearth so as to cause rotation of said rolls and from contact with the said rolls; and
d. drive means for moving said support beam forward and rearward with said tunnel kiln.



4,013,404

METHOD OF DYEING HAIR WITH INDOLINES, INDOLES AND INDAZOLES

Richard Alfred Parent, Fairport, N.Y., and Frank Fred Loffelman, Middlesex, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 96,224, Dec. 6, 1970, abandoned. This application Apr. 7, 1975, Ser. No. 565,883

Int. Cl.² D06P *1/32, 3/06;* A61K *7/12*

U.S. Cl. 8—11 7 Claims

1. A method for dyeing hair and other keratinaceous materials which comprises contacting said materials with a compound selected from the group consisting of 5-aminoindoline, 5,6-diaminoindoline, 5,7-diaminoindoline, 5-amino-6-nitroindoline, 5-bromo-7-nitroindoline, 5-hydroxyindoline, 6-nitroindoline, 5-aminoindole, 6-aminoindole, 5-hydroxyindole, 5-methoxyindole, 5-hydroxy-2-methylindole, 5-amino-2,3-dimethylindole, 6-nitroindole, and 5-aminoindole.

4,013,405

AQUEOUS PRINTING PASTES FOR PRODUCING TRANSFER PRINTING PAPERS BY ROTARY SCREEN PRINTING

Henry Donenfeld, Brighton, Australia, assignor to Printon Australasia Pty. Limited, Victoria, Australia

Filed Mar. 12, 1974, Ser. No. 450,411

Claims priority, application Australia, Mar. 12, 1973, 2541/73; Apr. 2, 1973, 2833/73

Int. Cl.² D06P *0/00;* B41M *3/12*

U.S. Cl. 8—2.5 A 9 Claims

1. A sublimation printing paste for application to a substrate comprising a sublimable disperse dye, a thickener and water characterized by inclusion therein of an additive in an amount sufficient to improve the flow properties of said printing paste, said additive selected from the group consisting of 2-ethylhexyl alcohol, 2-ethylhexyl acetate, capryl acetate, phenyl methylacetate, eucalyptus oil, and emulsified ortho, meta, and para hydroxytoluene, so that said sublimable disperse dye may be transferred from said substrate to a textile fabric at a temperature at which said sublimable disperse dye sublimes.

4,013,406

PROCESS FOR CONTINUOUSLY DYEING FILAMENTS OF SLIVERS OF WET-SPUN ACRYLONITRILE POLYMERS

Ulrich Reinehr, Dormagen; Hans Lenz, Dormagen-Hackenbroich; Alfred Nogaj, Dormagen, and Günter Blankenstein, Stommeln, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 14, 1975, Ser. No. 541,065

Claims priority, application Germany, Jan. 16, 1974, 2401880

Int. Cl.² D06P *3/70*

U.S. Cl. 8—17 3 Claims

1. A process for the continuous, uniform and penetrative dyeing with high fastnesses of a sliver or a filament of an acrylonitrile copolymer which has been produced by a standard wet-spinning process, which comprises subjecting the unstretched filament or sliver before dyeing to a combined washing, pressing and drying pretreatment by washing said filament or sliver once or several times at a temperature of up to 70° C, squeezing it out between squeezing rollers and drying it under the effect of heat, so that the spun material has a residual moisture content of at most 10% by weight and a residual solvent content of at most 4% by weight of the residual moisture content, and thereafter dyeing said filament or sliver in a dye bath over a period of from up to 60 seconds at a temperature in the range of from 20° to 100° C, stretching to between 2.5 and 6.5 times their original length and aftertreating.

4,013,407

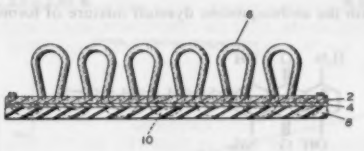
BACK DYEING, TUFTING, AND HOT AIR SUBLIMATION OF DYES TO PILE OF CARPETS

Leonard N. Ray, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Sept. 12, 1975, Ser. No. 612,772

Int. Cl.² D06P *7/00*

U.S. Cl. 8—17 5 Claims



1. A process for making a decorative carpet through the use of sublimable dyes comprising the steps of:

a. printing sublimable dyes on one side of the carpet backing prior to the time of the carpet face yarns are tufted into the carpet backing,

b. tufting the carpet face yarns into the carpet backing with the carpet face yarn pile being on the opposite side of the carpet backing from that side of the carpet backing which contains the sublimable dyes,

c. transferring the sublimable dyes from the carpet backing to the carpet face yarn through the application of a heated gaseous medium passing through the carpet from the carpet backing side of the carpet to the carpet face yarn side of the carpet, said heated gaseous medium vaporizes the sublimable dyes on the carpet backing and moves and deposits the dye on the carpet face yarns and

d. applying a coating to the back of the carpet backing on that side of the backing which is the side of the carpet backing that had the design printed thereon with sublimable dyes to lock in excess or residual dyes to the back side of the carpet backing.

4,013,408

EXHAUST PROCESS FOR THE DYEING OF SYNTHETIC ORGANIC TEXTILE MATERIALS IN NAVY BLUE TO BLACK SHADES

Hans Wilhelm Liechti, Oberwil, and Raymond Défago, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

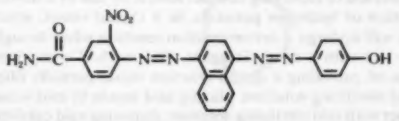
Division of Ser. No. 467,044, May 6, 1974, Pat. No. 3,972,676. This application Apr. 9, 1976, Ser. No. 675,387

Claims priority, application Switzerland, May 9, 1973, 6539/73; Mar. 23, 1974, 4360/74

Int. Cl.² C09B *27/00, 45/48*

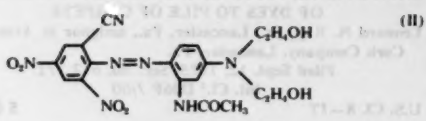
U.S. Cl. 8—26 13 Claims

1. A process for dyeing synthetic organic textile material in navy blue to black shades, by the exhaust process, from halogenated hydrocarbons, which process comprises the use of at least one disazo of formula I*a*

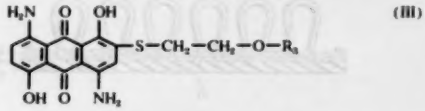


(Ia)

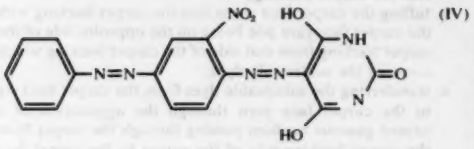
in admixture with the monoazo dyestuff of formula II


(II)

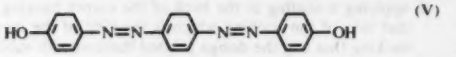
or with the anthraquinone dyestuff mixture of formula III


(III)

wherein R_3 represents a mixture of H and $-CH_2-CH_2-S-CH_2-CH_2-OH$, and in addition a small amount of the disazo dyestuff of formula IV


(IV)

or of formula V


(V)

4,013,409

5-HYDROXYMETHYL-1-AZA-3,7-DIOXABICYCLO[3.3.0]-OCTANE AS A SETTING AGENT FOR PERMANENT WAVING

Warren J. Eggers, Aurora, Ill., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed June 23, 1975, Ser. No. 589,290
Int. Cl.² A61K *7/09*
U.S. Cl. 8—127.51 **4 Claims**

1. A method for treating keratinic fiber which has been treated with a thiol reducing compound comprising the steps of applying to said fiber an effective amount of a 5–15% by weight aqueous solution of -5-hydroxymethyl-1-aza-3,7-dioxabicyclo[3.3.0] octane, rinsing with water and drying said fiber.

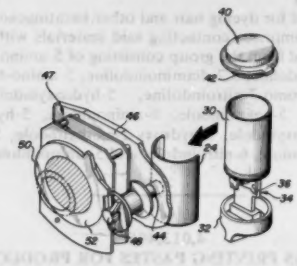
4,013,410

CONTACT LENS STERILIZATION PROCESS AND APPARATUS

Michael D. Thomas, Elmhurst, and Francis E. Ryder, Barrington, both of Ill., assignors to Ryder International Corporation, Schaumburg, Ill.

Filed June 23, 1975, Ser. No. 589,241
Int. Cl.² A61L *13/00, 3/00*
U.S. Cl. 21—58 **12 Claims**

1. A method of sterilizing contact lenses, by use of a sterilizing solution of hydrogen peroxide, in a closed vessel, which solution will undergo a decomposition reaction when brought into contact with a catalytic agent, said method comprising the steps of: providing a closed reaction vessel partially filled with said sterilizing solution; placing said lenses in said vessel in contact with said sterilizing solution; disposing said catalytic agent internally of said vessel but out of contact with said sterilizing solution; maintaining the strength of said sterilizing solution by delaying the decomposition reaction which will take place between said solution and said catalytic agent, said step of maintaining the strength of the sterilizing solution including the steps of, positioning said vessel in a first orientation with said lenses in contact with said sterilizing solution while said catalytic agent is disposed above and out of contact with said sterilizing solution, inverting said vessel after a prescribed period of time to reposition said vessel in a second



orientation with said catalytic agent then becoming immersed in said sterilizing solution thereby commencing the decomposition reaction which will ultimately result in decay of said sterilizing solution, with said lenses remaining in contact with said sterilizing solution during said first and second orientations and allowing said sterilizing solution to decay to a level wherein the strength thereof is at a concentration non-injurious to eye tissue.

4,013,411

METHOD FOR DETECTING HEPATITIS ASSOCIATED ANTIGEN

Saul I. Shupack, Wayne, Pa., and Stephen F. Malin, Burlington, Mass., assignors to Villanova University, Villanova, Pa.

Continuation-in-part of Ser. No. 177,134, Sept. 1, 1971, abandoned. This application July 19, 1974, Ser. No. 489,907
Int. Cl.² G01N *31/02, 33/16*
U.S. Cl. 23—230 B **25 Claims**

1. A method for testing biological materials for the presence of the hepatitis associated antigen which comprises contacting a biological material to be tested, in the presence of water, with at least one water soluble reagent selected from the group consisting of

cis, bis-triethylphosphine platinum (II) dichloride,
cis, bis-triphenylphosphine hydrido platinum (II) chloride,

and the anions

ethylene platinum (II) trichloride,
carbonyl platinum (II) trichloride,
trans-2-butene platinum (II) trichloride, and
isobutene platinum (II) trichloride,

said anions being associated with a non-interfering cation; said contact producing a characteristic presistent precipitate detectable in the reaction mixture if the biological material contains the hepatitis associated antigen, whereas any precipitate formed initially is not persistent if the biological material is free of said antigen.

4,013,412

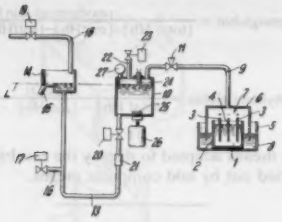
METHOD FOR JUDGING PURITY OF PURIFIED ZINC SULPHATE SOLUTION USED FOR ELECTROLYTIC PRODUCTION OF ZINC

Satoshi Mukae, Shimonoseki, Japan, assignor to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed July 22, 1975, Ser. No. 598,031
Claims priority, application Japan, Aug. 1, 1974, 49-88274
Int. Cl.² G01N *31/12*; C25B *1/04*; C25C *1/16*; G01N *7/06*
U.S. Cl. 23—230 PC **1 Claim**

1. A method of ascertaining the purity of a purified zinc sulphate solution used for the electrolytic production of zinc comprising the steps of sampling a part of said purified zinc

sulphate solution and subjecting the same to electrolysis to generate a mixture of hydrogen gas and oxygen gas, feeding said gas mixture into a combustion chamber, igniting said hydrogen gas in said gas mixture by an ignition heater disposed within said combustion chamber while said combustion

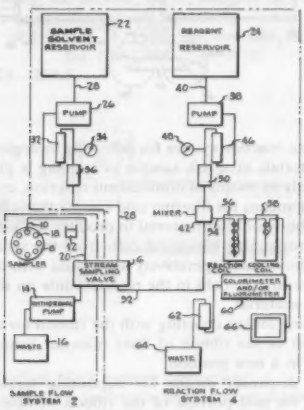


chamber is fully closed, and measuring the internal pressure of said combustion chamber before and after the combustion of said hydrogen gas, thereby measuring the content of said hydrogen gas in said gas mixture so as to ascertain the purity of said zinc sulphate solution on the basis of the hydrogen gas content thus measured.

4,013,413
APPARATUS AND METHOD FOR RAPID ANALYSES OF PLURALITY OF SAMPLES

Kent K. Stewart, Silver Spring; Gary R. Beecher, Laurel, and Peter Edgar Hare, Takoma Park, all of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed July 10, 1975, Ser. No. 594,893
Int. Cl.² G01N *1/00, 31/00*
U.S. Cl. 23—230 R **8 Claims**



7. A method of analysis of a plurality of fluid samples, comprising:

a. indexing a series of samples in sequence into sampling position;

b. introducing the samples into a sample flow system in sequence;

c. separating successive samples from each other in the sample flow system with individual segments of air, wash solution and air;

d. energizing a stream sampling valve to remove a portion of each sample only and to transfer each of said portions to a reaction flow system in which fluid is flowing continually at a constant rate;

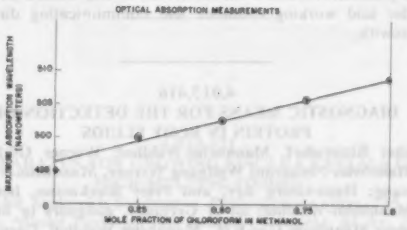
e. mixing and reacting each sample with an appropriate reagent; and

f. analyzing the reacted sample.

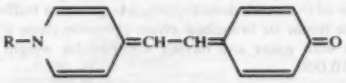
4,013,414
INDICATOR DYE

Francois A. Lavallee, Willoughby Hills, Ohio; Donald G. LeGrand, Burnt Hills, and George L. Gaines, Jr., Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed May 5, 1975, Ser. No. 574,725
Int. Cl.² G01N *31/00, 31/22*
U.S. Cl. 23—230 R **8 Claims**


OPTICAL ABSORPTION MEASUREMENTS
BATHOCHROMIC ABSORPTION WAVELENGTH (NANOMETERS)
MOLE FRACTION OF CHLOROFORM IN METHANOL

1. A method of identifying the acid condition of a liquid medium employing an organic solvent which comprises dissolving in said liquid medium a quantity of a soluble dye having the general formula

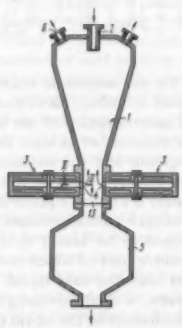


wherein R is an aliphatic hydrocarbon radical having approximately 12 to 20 carbon atoms so that color changes shift to longer wavelengths with increasing polarity of solvent and observing the color produced thereby.

4,013,415
PLASMA-CHEMICAL REACTOR FOR TREATMENT OF DISPERSE MATERIALS

Igor Sergeevich Burov, ulitsa Yakuba Kolosa, 39, kv. 48; Vladimir Vladimirovich Byshuk, ulitsa Ostrovskogo, 27, kv. 56; Alfred Lvovich Mosse, Leninsky prospekt, 72a, kv. 66; Leonid Stepanovich Shkurko, ulitsa Pulikhova, 35, kv. 1, and Vyacheslav Andreevich Vashkevich, ulitsa Mendeleeva, 7, kv. 71, all of Minsk, U.S.S.R.

Filed June 7, 1974, Ser. No. 477,336
Int. Cl.² B01J *1/00*
U.S. Cl. 23—252 R **12 Claims**



1. A plasma-chemical reactor for treatment of disperse materials, with a process gas comprising: a vertical working

chamber; means for feeding the disperse materials into the top portion of said working chamber; a plurality of plasmatrons for plasma-heating of the process gas, said plasmatrons having nozzles arranged around and joined with the periphery of the bottom portion of said working chamber and directed generally at right angles to the vertical axis of said working chamber for feeding process gas directly into the bottom portion of said working chamber; means for withdrawing gaseous products from said working chamber at a location above the nozzles of said plasmatrons; and a bin connected to and located directly under said working chamber and communicating directly therewith.

4,013,416
DIAGNOSTIC MEANS FOR THE DETECTION OF PROTEIN IN BODY FLUIDS

Walter Rittersdorf, Mannheim-Waldhof; Werner Güthlein, Mannheim-Neckarau; Wolfgang Wecner, Mannheim-Vogelstang; Hanz-Georg Rey, and Peter Rieckmann, both of Mannheim-Waldhof, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed Feb. 26, 1976, Ser. No. 661,687

Claims priority, application Germany, Mar. 12, 1975, 2510633

Int. Cl.² G01N *31/22, 33/16*

U.S. Cl. 23—253 TP **44 Claims**

1. A diagnostic means for the detection of protein in body fluids, comprising an absorbent carrier impregnated with a pH indicator of the octahalosulfophthalein group, a buffer, and at least one linear or branched chain polypropylene glycol immiscible with water and having a molecular weight of from 500 to 10,000.

4,013,417
ANALYZER FOR THE DETERMINATION OF HEMOGLOBIN AND OTHER RELATED COMPOUNDS IN WHOLE BLOOD AND HEMOGLOBIN SOLUTIONS

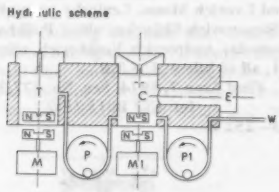
Italo Raffaele, Milan, Italy, assignor to Biomedix A.G., Vaduz, Liechtenstein

Filed July 31, 1975, Ser. No. 600,802

Claims priority, application Italy, Aug. 9, 1974, 26213/74

Int. Cl.² G01N *33/16, 21/26*

U.S. Cl. 23—253 R **10 Claims**



1. An analyzer for the automatic testing of samples of 5 to 10 μl of hemoglobin solutions, particularly whole blood, and for the automatic determination of the total hemoglobin and of the percentage contents of at least the deoxyhemoglobin, the carboxyhemoglobin and the oxyhemoglobin, and/or the ratio of the third to the first component, comprising a tonometer, in which a buffer is kept in equilibrium with a gas having a predetermined oxygen partial pressure, a first pump for the transfer of the liquid to be tested to a cuvette, an oxygen electrode, the sensitive part of which is contained within said cuvette in contact with the said liquid, a second pump for emptying the cuvette, a dual wavelength optical system for measuring the absorbances of the liquid present in the cuvette at the wavelengths of 497 and 565 nm, light sensors adapted to sense the light passing through said optical system, computer means adapted to be fed with electrical signals, respectively corresponding to the values sensed by the oxygen electrode and by the said light intensity sensors, and to process said signals according to the equations:

$$[\text{Hb tot}] = \frac{A_{497}}{(1 - K - K') + \epsilon^{\lambda}_{497}K + \epsilon^{\lambda}_{497}K'},$$

$$\% \text{ oxyhemoglobin} = \frac{[\text{oxyhemoglobin}]}{[\text{total Hb}] - [\text{metHb}] - [\text{sulfHb}] - [\text{COHb}]},$$

and

$$\% \text{ carboxyhemoglobin} = \frac{[\text{HbCO}]}{[\text{total Hb}] - [\text{metHb}] - [\text{sulfHb}]},$$

and display means adapted to display the results of the calculations carried out by said computer means.

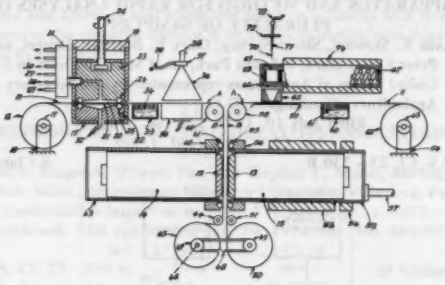
4,013,418
LUMINESCENT REACTION TESTING

Chris J. Plakas, Alexandria, Va., assignor to Vitatek Corporation, Alexandria, Va.

Continuation-in-part of Ser. No. 630,943, Nov. 12, 1975. This application Feb. 19, 1976, Ser. No. 659,534

Int. Cl.² C12K *1/10*; G01N *33/16*; G21H *5/00*

U.S. Cl. 23—253 R **10 Claims**



1. A surface reaction system for detecting biological cells as reactive materials in a test sample containing a plurality of biological cells by means of luminescent reaction, comprising:

A. filtering means for filtering said sample through an elongated ribbon of filter material to produce a residue on the ribbon containing biological cells from the sample,

B. extraction means operatively associated with the ribbon for rupturing the cells in the residue while on said ribbon of filter material,

C. advancing means coacting with the ribbon for advancing a portion of the ribbon of filter material containing the residue to a new position,

D. liquid dispenser means for depositing liquid reagent directly on said portion of the ribbon of filter material containing the residue while said portion is in said new position, and

E. photodetector means in optical proximity to the ribbon for detecting the intensity of a luminescent reaction which occurs when the reagent and the ruptured cells in the residue react together.

4,013,419
DIGESTION BOMB

Peter R. Betzer, 1830 7th St. North, St. Petersburg, Fla. 33704, and Donald Eggimann, 2869 60th St. North, St. Petersburg, Fla. 33710

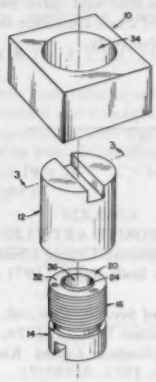
Filed Jan. 30, 1976, Ser. No. 653,756

Int. Cl.² B65D *41/04*; G01N *31/12*

U.S. Cl. 23—259 **2 Claims**

1. A digestion bomb assembly comprising, in concentric

relationship, a cylindrical container including a cylindrical cavity and a sealable annular rim portion, a cylindrical cap threadably and sealingly engagable with said container, said cap including a sealable cylindrical shaped portion having an angled edge configured and dimensioned to receive the said



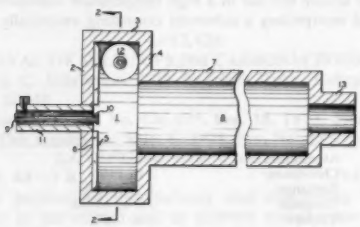
rim portion of said container, and a removable rigid collar encircling the container and the cap at the threaded portion thereof, said container and said cap being composed of an inert metal-free plastic material and said collar being composed of a plastic material.

4,013,420

CARBON BLACK REACTOR

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 23, 1975, Ser. No. 580,383
Int. Cl.² C09C *1/48, 1/50*
U.S. Cl. 23—259.5 **4 Claims**



1. In a carbon black reactor comprising:

a. an essentially cylindrically shaped precombustion section confined by an upstream wall, a cylindrical wall and a downstream wall;

b. in axial alignment and open communication with said precombustion section a reaction section having an upstream inlet opening in said downstream wall of smaller diameter than the diameter of said cylindrical wall;

c. first conduit means attached to the reactor for the axial introduction of the hydrocarbon feed into the reactor;

d. second conduit means attached to the precombustion section for the tangential introduction of hot combustion gases into the precombustion section;

e. third conduit means for the withdrawal of carbon black-containing gas attached to the downstream end of the reaction section;

the improvement comprising

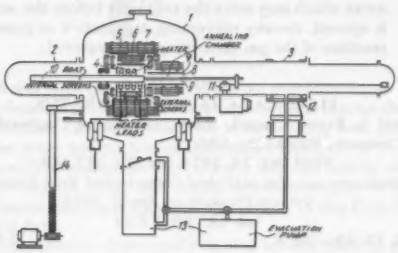
f. turbulence-creating protrusions attached to at least one of said upstream and downstream walls confining said precombustion section, said protrusions being arranged and shaped such as to at least partially destroy the inwardly spiraling boundary layer flow of the hot combustion gases that would exist without these protrusions and convert it into turbulent flow.

4,013,421

APPARATUS FOR GROWING SINGLE CRYSTALS OF HIGH-MELTING OXIDES

Khachik Saakovich Bagdasarov, Profsojuznaya ulitsa, 115, kv. 46; Nikolai Pavlovich Ilin, Leninsky prospekt, 44, kv. 260, both of Moscow, and Jury Alexandrovich Starostin, Leninsky raion, poselok Gazoprovod, 1, kv. 4, Moskovskaya oblast, all of U.S.S.R.

Filed Dec. 30, 1974, Ser. No. 537,571
Int. Cl.² B01J *17/08;* **H05B** *5/12*
U.S. Cl. 23—273 SP **4 Claims**

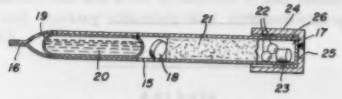


1. An apparatus for growing single crystals of high-melting oxides in the form of lamellae, by crystallizing a melt in a boat, comprising: a crystallization chamber; a resistance heater accommodated in said crystallization chamber and composed of a coil having turns made of a rod material; current leads connected to an external power supply and having clamp means for securing said leads to ends of said heater for supplying power thereto; a metal boat containing the melt being crystallized; driving means for moving said metal boat with the melt through the coil turns of the resistance heater, said turns surrounding the boat when the latter is placed in the heater of the crystallization chamber and being arranged in planes normal to the boat axis and having incomplete sections distributed with a greater number of said sections in a bottom portion, where the melt is heated through the material of the boat, than in a top portion, where the melt is heated directly, with the result that the bottom and top portions of the turns ensure uniform heating of the melt in the boat; a multilayer system of sheet screens surrounding said resistance heater and including an internal layer of said screens, nearest to said resistance heater, made up of rods of a refractory material, adjoining one another along the entire length thereof and extending beyond the heater and defining beyond the heater an elongated space serving as an annealing chamber near the exit of the boat from the space defined by the coil turns of the heater, said current leads each include two parallel plates respectively having aligned holes for an end of the heater to be fitted therein and said plates being movable apart to ensure clamping of the heater end in said holes, and lock means connected with said plates for locking them in the position which they occupy when moved apart.

4,013,422
GAS GENERATING APPARATUS

Ernest Elliott Spinner, Grandview, Mo., and Melvin Wayne Hounsell, Beloit, Wis., assignors to Marion Laboratories, Inc., Kansas City, Mo.

Filed Dec. 22, 1975, Ser. No. 643,259
Int. Cl.² B01J *7/02*
U.S. Cl. 23—282 **30 Claims**

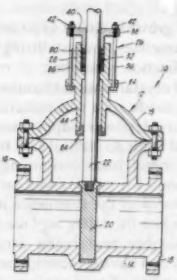


1. A gas generating apparatus comprising:
a container having an opening,
a gas generating solid material in the container,
an ampoule containing a liquid which is reactive with the solid material to produce a gas, said ampoule being rupturable by squeezing the outside of the container to free the liquid to contact the solid material,
means in the container which prevents liquid from flowing from the container after the ampoule is opened but which permits flow of gas generated in the container out of the container opening, and
a solid desiccant material in the container which absorbs water which may enter the container before the ampoule is opened, thereby preventing degradation or premature reaction of the gas generating solid material.

4,013,423
FLUID CAT CRACKER APPARATUS

David A. Evens, Cloquet, Minn., assignor to Continental Oil Company, Ponca City, Okla.

Filed Oct. 24, 1974, Ser. No. 517,668
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976
Int. Cl.² B01J *8/24*
U.S. Cl. 23—288 S **2 Claims**

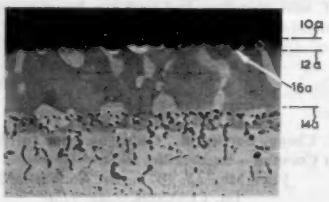


1. In an apparatus for carrying out a petroleum fluid catalytic cracking process, said apparatus including a catalytic reactor and a catalyst regenerator connected by conduit means through which particulated catalyst and mixtures of particulated catalyst and oil flow at superatmospheric pressure and high temperature, and including at least one shutoff valve disposed in said conduit means, the improvement wherein:
said shutoff valve includes a valve stem disposed in a valve body, a valve stem guide means in and attached to said body, and a valve stem packing gland positioned between said guide means and the exterior of said valve body, and wherein said valve stem guide means comprises:
a. a cylindrical guide member having a bore therethrough in which said valve stem is slidably disposed;
b. at least one annular groove disposed in said bore; and
at least one expansible seal ring disposed within said groove around said valve stem, said seal ring being of a size and shape such that a seal is provided thereby between said valve stem and the inside surfaces of said groove whereby pressurized materials present within said valve body are prevented from flowing through said guide means into said valve stem packing gland and other areas of close clearance between said valve stem and said valve body.

4,013,424
COMPOSITE ARTICLES

Paul Wildgoose, and Raymond George Ubank, both of Bristol, England, assignors to Rolls-Royce (1971) Limited, Bristol, England

Continuation-in-part of Ser. No. 264,340, June 19, 1972, abandoned. This application Dec. 12, 1974, Ser. No. 532,248
Claims priority, application United Kingdom, June 19, 1971, 28893/71; July 6, 1971, 31517/71
Int. Cl.² B32B *15/00*
U.S. Cl. 29—194 **10 Claims**



1. An article for use in a high temperature corrosive environment comprising a substrate consisting essentially of, by weight:

Aluminium	5 to 7%
Chromium	3 to 14%
Tantalum	1.5 to 12%
Tungsten	3.5 to 13.5%
Yttrium	0 to 0.5%
Nickel	Remainder

and the article further comprising a coating consisting essentially of, by weight:

Aluminium	10 to 30%
Chromium	3 to 14%
Tantalum	1.5 to 12%
Tungsten	3.5 to 13.5%
Yttrium	0.01 to 0.5%
Nickel	Remainder

wherein the contents of chromium, tantalum, tungsten and nickel occur in similar proportions in the substrate and the coating but to a lesser total amount in the coating to accommodate the higher aluminium content thereof.

4,013,425

THERMOMETRIC BIMETALLIC STRUCTURE OF HIGH STRENGTH AT HIGH TEMPERATURE

Horst Mühlberger, Frankfurt am Main, and Manfred Rühle, Offenbach, both of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 22, 1976, Ser. No. 698,494

Claims priority, application Germany, June 26, 1975, 2528457

Int. Cl.² B32B *15/18*; C22C *38/04*, *38/12*, *38/46*

U.S. Cl. 29—195.5 14 Claims

1. A thermometric bimetallic structure having high strength at elevated temperature and comprising an active component and a passive component secured together, said active component consisting of an iron-nickel alloy having a coefficient of expansion of about $19 \times 10^{-6} \cdot °C^{-1}$ to $22 \times 10^{-6} \times ° C^{-1}$ and composed by weight of

0.4% to 0.9%	carbon,
0.03% to 0.10%	nitrogen,
10.0% to 14.0%	nickel,
3.0% to 7.0%	manganese,
0.2% to 1.0%	niobium and/or tantalum,
0.5% to 1.5%	vanadium,
up to 1.5%	molybdenum,
up to 1.5%	tungsten,
up to 3.5%	chromium,
up to 0.5%	silicon, and
balance	iron with impurities which are due to the melting conditions,

the total of vanadium, molybdenum and tungsten being at most 2%; the passive component being metallic and having a coefficient of expansion of about $3 \times 10^{-6} \cdot °C^{-1}$ to $12 \times 10^{-6} \times ° C^{-1}$.

4,013,426

REMOVAL OF SULFUR FROM CARBONACEOUS FUEL

Wilburn C. Schroeder, 7316 Radcliffe Drive, College Park, Md. 20740

Continuation of Ser. No. 426,039, Dec. 18, 1973, abandoned. This application Mar. 5, 1975, Ser. No. 555,405

Int. Cl.² C10L *9/10*; C10B *57/00*

U.S. Cl. 44—1 R 14 Claims

1. A process for desulfurizing coal comprising feeding crushed or pulverized coal at ambient temperature into a single desulfurization zone of a closed pressurized cyclic system, contacting the coal in said desulfurization zone with recycled hydrogen-containing gases and with burned recycle gases which provide sufficient heat to raise the temperature of the coal to a temperature within the range of about 1100° F to 1800° F thereby causing release of hydrogen from the coal, cracking of hydrocarbons in the coal to form hydrogen and methane and conversion of the sulfur compounds in the coal by reaction with part of the hydrogen in contact with the coal to form hydrogen sulfide, separating the desulfurized coal from the resulting hydrogen, methane and hydrogen sulfide containing gases, removing hydrogen sulfide from said gases, recycling a portion of the purified hydrogen and methane-containing gases to said desulfurization zone, introducing oxygen from an air separation plant into another portion of said purified hydrogen and methane gases and burning said gases with said oxygen to provide said burned recycle gases, and introducing the resulting burned recycle gases into said desulfurization zone to supply sufficient heat to raise the temperature of the coal to a temperature within said range, essentially the sole reactants fed to the system being coal and oxygen.

4,013,427

SLAG BATH GENERATOR

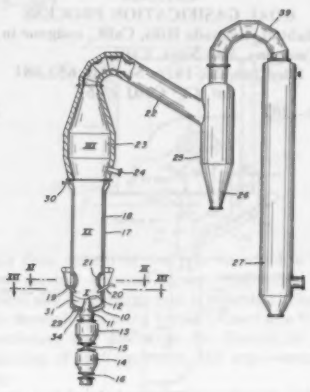
Paul Gernhardt; Siegfried Pohl; Wilhelm Danguillier, all of Bochum, and Wolfgang Grams, Wanne-Eickel, all of Germany, assignors to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Dec. 22, 1975, Ser. No. 642,899

Claims priority, application Germany, Jan. 31, 1975, 2504060

Int. Cl.² C10J *3/46*, *3/48*

U.S. Cl. 48—62 R 10 Claims



1. A slag bath generator including the combination of:

a cylindrical pressure shell defining a vertical reactor shaft,

wall means carried by said shell to form a slag bath within the lower end portion of said reactor shaft,

an overflow wall projecting centrally into said reactor shaft to maintain a slag bath within the lower portion of said reactor shaft by discharging an overflow of slag from said slag bath,

nozzles directed downwardly in said reactor shaft to produce a turbulent rotary motion at the surface of the slag bath by impingement of fine-grained fuel and a gasification medium fed by said nozzles in a generally tangential direction onto said slag bath,

vertical coolant pipes surrounding said reactor shaft within said shell, said coolant pipes extending from said shell above said overflow wall to define a circumferential constriction, some of said coolant pipes projecting into said reactor shaft at a distance greater than the distance which other coolant pipes project in a manner to provide a serrated form to said circumferential constriction,

a cupola coupled to said reactor shaft for forming a cooling zone, and

gas-conducting means to supply cooling gas into said cupola.

5. A method of gasifying fine-grained fuel in a slag bath generator, said method including the steps of:

injecting fine-grained fuel and a gasifying medium at a downwardly-inclined angle to tangentially impinge with a turbulent rotary motion upon a slag bath in the lower end of a vertically-extending reactor shaft formed by a vessel adapted to operate under pressure,

maintaining a desired slag bath level in the vessel by discharging slag through an overflow in the bottom of said vessel,

using a first treatment zone lying between the slag bath and a serrated circumferential constriction to said reactor shaft for high temperature gasification of said fuel,

forming said serrated circumferential constriction by bent portions of vertically-arranged coolant pipes surrounding said reactor shaft,

using a second treatment zone lying above said serrated

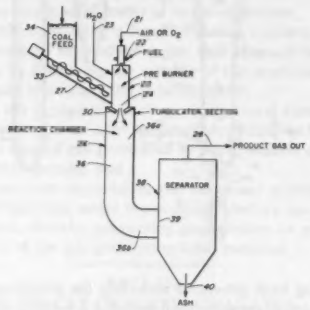
circumferential constriction in the reactor shaft for final gasification of the fuel at a lower temperature as compared with the temperature in the first treatment zone, said serrated circumferential constriction being adapted to conduct fuel and gases into the second treatment zone while reducing the turbulent rotary motion thereof, and discharging the fuel and gases from the top end of the reactor shaft into a cupola forming a third treatment zone for cooling the fuel and gases.

4,013,428

COAL GASIFICATION PROCESS

Robert P. Babbitt, Granada Hills, Calif., assignor to The Marquardt Company, Van Nuys, Calif.

Filed Jan. 26, 1976, Ser. No. 652,081
Int. Cl.² C10J 3/46
U.S. Cl. 48—202 **24 Claims**



1. A process for the gasification of coal comprising the steps of:

a. combusting a hydrogen containing fuel and oxidizer selected from the group consisting of oxygen and air in a preburner to produce steam at a temperature substantially above the minimum temperature at which steam will react will coal to produce carbon monoxide and hydrogen, said minimum temperature being approximately 1712° F;

b. introducing said steam and pulverized coal into a gasifier in controlled amounts and reacting the coal and steam in a substantially oxygen free environment while maintaining the reaction temperature above said minimum temperature throughout said gasifier; and

c. discharging product gas comprising CO and H_2 from said gasifier at approximately said minimum temperature, the controlled amounts of said coal and said steam introduced to the gasifier being such that the coal and steam are substantially completely reacted to CO and H_2 and ash by the time of discharge.

4,013,429

FRACTIONATION OF AIR BY ADSORPTION

Shivaji Sircar, Allentown, and John W. Zondlo, Bethlehem, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed June 4, 1975, Ser. No. 583,787
Int. Cl.² B01D 53/04
U.S. Cl. 55—33 **10 Claims**

1. The method for production of high purity nitrogen and an oxygen-enriched product from air containing water vapor and carbon dioxide, which comprises:

1. during an on-stream period carried out at substantially atmospheric pressure

a. introducing ambient air into a first bed of adsorbent effective in adsorption of said water vapor and carbon dioxide;

b. discharging unadsorbed gaseous effluent from said first adsorbent bed into a second adsorbent bed in series therewith and containing an adsorbent selective in retention of nitrogen as opposed to oxygen;

c. continuously during said on-stream period withdrawing from said second bed a primary gaseous effluent stream as an oxygen-rich product having a higher oxygen concentration than the air stream charged to said bed;

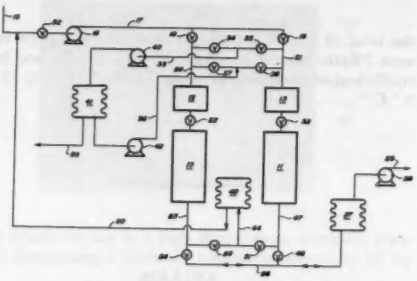
d. collecting said primary gaseous effluent in an expandable receiver;

2. discontinuing introduction of charge to said first bed of adsorbent and initiating removal of contained gases from said first and second beds by

e. first rinsing said beds with high purity nitrogen gas introduced into said first bed and flowed through said bed into and through said second bed at a rate and for a time period sufficient to effect removal of void air from both beds and short of breakthrough of adsorbed water from said first bed; while collecting the rinse gas effluent from said second bed in a receiver separate from that in which said primary effluent was collected;

f. discontinuing introduction of said rinse gas to said first bed and the flow thereof to said second bed;

g. reducing the pressure at the air inlet end of said first bed while retaining gas flow communication between said first and second beds and causing substantially all



of the nitrogen retained by said adsorbent during step (b) to flow through said first bed, thereby inducing desorption of water vapor and carbon dioxide from said first bed and desorption of nitrogen from said second bed;

h. collecting the desorbed gases rich in nitrogen in an expandable receiver, a portion of which collected gases from said receiver is employed as rinse gas in step (e);

i. thereafter discontinuing gas flow communication between said second and first bed, while continuing withdrawal of gas only from said first bed to a further reduced pressure level;

j. during said continued withdrawal of gas from said first bed introducing into said second bed a portion of the oxygen-rich primary effluent from step (d) thereby restoring said second bed to substantially its initial on-stream pressure;

k. thereafter discontinuing withdrawal of gas from said first bed and restoring gas flow communication between said second and first bed to permit flow of contained pressuring gas from said second to said first bed to bring said first bed to substantially its on-stream pressure;

l. when said first bed has substantially reached its on-stream pressure again initiating a new cycle in the recited sequence with an on-stream period commencing with step (a).

4,013,430
PROCESS FOR REGENERATING ABSORBING SOLUTION USED FOR EXHAUST GAS PURIFICATION

Keiji Adachi; Tokio Gorai, both of Chiba; Kazuaki Ohami, Funabashi; Takehiko Takahashi, and Takayoshi Mizukami, both of Ichihara, all of Japan, assignors to Chisso Corporation, Osaka and Chisso Engineering Co. Ltd., Tokyo, both of, Japan

Filed Dec. 29, 1975, Ser. No. 645,174
Claims priority, application Japan, Dec. 28, 1974, 50-3986; Dec. 28, 1974, 50-3987
Int. Cl.² B01D *53/14*
U.S. Cl. 55—37 5 Claims

1. In the process for treating industrial exhaust gased containing nitrogen oxides and SO_2 with an absorbing solution containing an iron chelate complex salt and a sulfite in an absorbing zone to remove nitrogen oxides and SO_2 from the industrial exhaust gases, the improvement which comprises regenerating and recirculating the absorbing solution by

a. cooling the absorbing solution withdrawn from said absorbing zone during or after the absorption treatment, at a pH of 3.0 or lower and a temperature of about 0° C, to precipitate and remove the chelating agent constituting said iron chelate complex salt contained in the absorbing solution;

b. heating the resulting absorbing solution at a temperature of 80° C or higher, to decompose dithionate, imidodisulfate and amidosulfate contained in the absorbing solution;

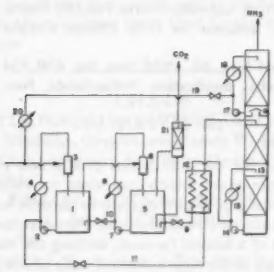
c. removing SO_2 liberated from the absorbing solution, and removing ammonium sulfate by evaporating the absorbing solution to crystallize out and remove ammonium sulfate; and

d. recirculating the resulting regenerated absorbing solution to said absorbing zone.

4,013,431
PARTIAL OR COMPLETE SEPARATION OF GAS MIXTURES, CONTAINING AMMONIA AND CARBON DIOXIDE

Wilhelm Berkel, Mutterstadt, and Hans Gettert, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Apr. 1, 1974, Ser. No. 456,905
Claims priority, application Germany, Apr. 7, 1973, 2317603
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² B01D *53/14*
U.S. Cl. 55—70 8 Claims

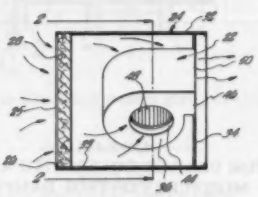


1. A process for the separation of a gas mixture containing ammonia and carbon dioxide by absorption in a solvent, which process comprises carrying out the absorption of said gas mixture in a mixing zone in which water as the solvent and said gas mixture are intimately mixed and thereafter separating non-absorbed gas mixture and water from one another, the residence time of the gas in the mixing zone being limited to a maximum of 0.1 second in order to absorb the ammonia to a substantially greater extent than the carbon dioxide.

4,013,432
BLOWER AND DUCT ARRANGEMENT FOR AIR FILTERING SYSTEM

Richard H. Finger, Hollywood, Fla., assignor to Klykon, Inc., Miami, Fla.

Filed Apr. 21, 1975, Ser. No. 569,817
Int. Cl.² B01D *46/10*
U.S. Cl. 55—467 6 Claims



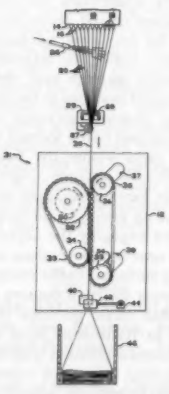
1. An air flow system of the type in which a centrifugal blower unit having a motor-driven, essentially cylindrical, rotor element and a discharge port is mounted in an enclosure to draw air through a filtering media located at a first opening of said enclosure and discharge the filtered air through a second opening of said enclosure, the improvement therein comprising:

said blower unit located within the enclosure and tilted with respect to the horizontal axis of said enclosure so that the axis of rotation of its rotor element extends along a line which makes an angle with the horizontal axis of said enclosure of between 15° to 75° inclusive, and has its midpoint located at approximately the geometric center of said enclosure.

4,013,433
METHOD AND APPARATUS FOR PREPARING CONTAINER PACKAGES OF GLASS STRAND

Thomas J. Briar, Trafford, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 1, 1976, Ser. No. 662,396
Int. Cl.² C03B *37/02*
U.S. Cl. 65—2 15 Claims



1. In combination with a glass fiber forming bushing an attenuator for attenuating glass strand from said bushing com-

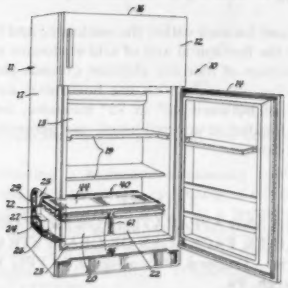
prising a pair of elongated, driven, double toothed belts, said belts being meshed for a portion of their length between which said glass strand passes, a plurality of driven toothed pulleys around which said belts are driven and means for driving said pulleys and belts.

4,013,434

HYDRATOR DRAWER COVER WITH ADJUSTABLE MOISTURE CONTROL DAMPER

Paul E. Kronenberger, and Robert Smith, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,634
Int. Cl.² F25D 17/04
U.S. Cl. 62—382 4 Claims



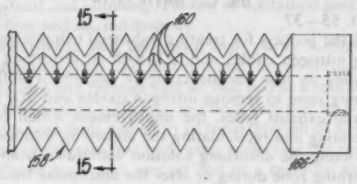
1. In a refrigerator cabinet having a food storage chamber furnished with a front access opening normally closed by a door, a refrigerating system associated with said cabinet including a refrigerant evaporator for chilling the interior thereof; a food storage closed receptacle in said chamber having an air vent for receiving refrigerated air from said chamber, a one piece baffle for adjusting the quantity of refrigerated air flowing through said vent, said receptacle having baffle engagement portions in the form of a plurality of spaced concave-like bearing surfaces opening outwardly therefrom, one edge of said baffle formed with a convex hinge surface adapted to pivot within the bearing surfaces, said baffle including a flexible arcuate finger formed integrally therewith, said finger located adjacent the opposite edge of said baffle and extending through said vent, said finger having an arcuate surface for engaging the adjacent edge portion of said vent, said finger spaced intermediate adjacent pairs of the concave-like bearing surfaces, baffle retaining means on said receptacle at said finger location causing elastic longitudinal arching of the flexible baffle between its bearing portions, which arching acts to frictionally hold said finger arcuate surface in a given relative position with said vent edge, and said finger including stop means for engagement with a stop surface carried by said receptacle, whereby said baffle may be rotated by the user from a fully closed to a fully open setting while imparting positioned stability so that the user may retain said baffle at any desired intermediate setting between its open and closed positions.

4,013,435

PRODUCTION OF ORGANIC FIBERS WITH INORGANIC CORES

John L. Kane, and George R. Machlan, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Mar. 12, 1975, Ser. No. 557,721
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C03B 37/02; C03C 25/02
U.S. Cl. 65—11 W 7 Claims



1. Apparatus for forming and coating filaments comprising a first tip section having a plurality of orifices from which a first fan of filaments are attenuated in a downward direction, a first applicator comprising a body having a supply chamber, a plurality of first grooves positioned in a common generally vertical plane, and passage means connecting said supply chamber with said grooves, means below said applicator for gathering said filaments into a strand, means for packaging the strand, a second tip section having a second plurality of second orifices from which a second fan of filaments are attenuated in a downward direction, a second applicator comprising a second body having a second supply chamber, a second plurality of second grooves positioned in a common generally vertical plane and parallel to the plane of the first grooves, and second passage means connecting said second supply chamber with said second grooves, second means below said applicator for gathering said second filaments into a second strand, second means for packaging the second strand, and an oven between said first and second applicators at one end and said first and second gathering means at the other end, said oven having at least one passage extending therethrough with heating means on opposite sides thereof for heating the first and second filaments passing therethrough.

4,013,436

METHOD FOR THE PRODUCTION OF OBJECTS OF QUARTZ-GLASS BY DRAWING

Gerardus Henricus Antonius Maria Van Der Steen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,534
Claims priority, application Netherlands, Nov. 18, 1974, 7414977
Int. Cl.² C03B 5/16
U.S. Cl. 65—32 1 Claim

1. A method for the continuous production of elongated objects of molten quartz which comprises: providing a starting material consisting of silicon dioxide in particle form, passing said starting material continuously at a predetermined rate to the upper part of a heated furnace, melting the starting material continuously in the upper, heated zone of the furnace in a gas atmosphere of hydrogen and helium in a volume ratio of 40–75% of hydrogen to 60–35% of helium at a melting temperature which is not less than 2050° C, heating of the molten material in the lower zone of the furnace by means of a separate heating device while a temperature is maintained which is less than 2050° C in the molten material and drawing the molten material continuously from the lower zone of the furnace by means of a forming device in the presence of an atmosphere containing hydrogen in a non-oxidizing carrier

gas, said starting material including silicon dioxide in particle form with oxides, hydroxides or compounds which upon heating are converted to oxides, of K and/or Mg in a quantity of between 50 and 200×10^{-3} mol.% and/or Ca, Ba and/or Sr. in a quantity of between 5 and 200×10^{-3} mol.%.

4,013,437

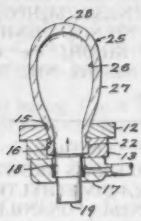
METHOD FOR FORMING GLASS BOTTLES

John D. Northup, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 502,388, Sept., 1974, abandoned. This application May 15, 1975, Ser. No. 577,629

Int. Cl.² C03B 9/14

U.S. Cl. 65—76 **3 Claims**



1. The method of forming a glass container or the like having thin walls of uniform thickness which comprises:

feeding a charge of molten glass to a fixed, inverted one-piece parison body mold, split shoulder mold and neck mold forming a composite cavity therein;

compacting the charge of glass in the composite cavity in the inverted blank or parison mold;

counter-blowing the charge against the walls of the mold cavity and against a bottom closing baffle at the upper end of the inverted blank or parison mold;

removing said baffle and the parison body mold;

applying air under pressure to the interior of the parison while being supported by the neck mold and shoulder mold to expand the glass both vertically and transversely to the extent that the wall thickness of the expanded portion of the parison is of uniform thickness throughout;

removing the shoulder mold from the parison;

inverting the parison while being supported in the neck mold;

enclosing the inverted parison within a blow mold;

permitting the parison to sag within the blow mold to an extent less than the full height of the blow mold;

and then expanding the parison within the blow mold cavity to form the container in its final form with uniform wall thickness.

4,013,438

APPARATUS FOR MANUFACTURE OF FLOAT GLASS

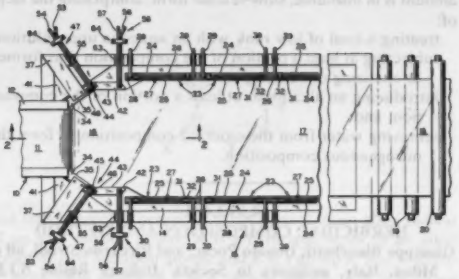
Norman K. Gladieux, Oregon, and James W. Miller, Rossford, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Oct. 6, 1975, Ser. No. 619,570

Int. Cl.² C03B 18/02

U.S. Cl. 65—94 **13 Claims**

12. In a method of operating a float glass facility to change from production of a glass ribbon of not substantially greater than equilibrium thickness to a ribbon of heavy glass wherein molten glass is continuously poured over a spout onto a body of molten metal in an elongated container between spaced restrictor tiles having extension tiles pivotally secured at their downstream ends and moved across said body to form said ribbon, the steps of installing fenders extending longitudinally along and spaced inwardly from the sides of said elongated container to restrict the lateral flow of said molten glass, and swinging the free ends of said pivotally secured extension tiles from a position outwardly of said fenders to a position inwardly thereof to direct said molten glass between said fenders.



4,013,439

GOB FORMING APPARATUS

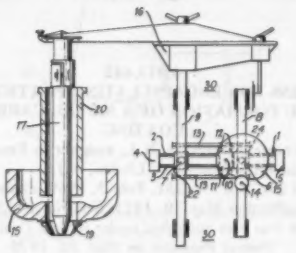
Petr Vik, Wembley, England, assignor to British Hartford-Fairmont Limited, England

Filed May 8, 1975, Ser. No. 575,693

Claims priority, application United Kingdom, May 13, 1974, 21076/74

Int. Cl.² C03B 9/00; G05G 1/00

U.S. Cl. 65—330 **6 Claims**



1. Gob forming apparatus for use in the production of glassware which apparatus comprises a refractory spout for molten glass and having an orifice in its floor, and, cooperating with the orifice, an axially reciprocating plunger, the plunger being mounted on an axially reciprocating shaft and a linkage for transmitting axial reciprocating movement to said shaft from a parallel shaft which is reciprocated by a drive means, the linkage comprising a bar; means pivotally mounting said bar, at a fixed position on the bar intermediate the ends of said bar, to a mounting member; means for adjusting the position of said mounting member in a direction parallel to said shafts and in a direction perpendicular to said shafts; a pivotal connection fixed on one axial shaft and slidably mounted on the bar to one side of said fixed position; and a pivotal connection fixed on the other axial shaft and slidably mounted on the bar to the other side of said fixed position.

4,013,440

NITROGENOUS FERTILIZERS

William Henry Vale, East Brighton, Australia, assignor to Scientific and Applied Processes Pty., Ltd., Norwell, Australia

Continuation-in-part of Ser. No. 370,983, June 18, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,310

Int. Cl.² C05F 11/02; C05C 9/00

U.S. Cl. 71—24 **17 Claims**

1. A process for the preparation of a nitrogeneous composi-

tion suitable for use as a fertilizer and a soil conditioner and having a substantial nitrogen content of which is significant amount is in insoluble, slow-release form, comprising the steps of:

treating a coal of low rank with an aqueous urea solution;

subjecting at least a portion of the composition thus formed to oxidizing conditions;

introducing an alkali into at least a portion of the composition; and

removing water from the oxidized composition to form the nitrogeneous composition.

4,013,441

HERBICIDAL COMPOSITION AND METHOD

Giuseppe Bianchetti; Donato Pocar, and Riccardo Stradi, all of Milan, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

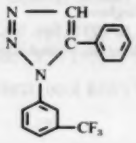
Filed Apr. 8, 1975, Ser. No. 566,050

Claims priority, application Italy, Apr. 19, 1974, 21651/74

Int. Cl.² A01N *9/22;* **C07D** *249/06*

U.S. Cl. 71—92 **8 Claims**

1. A triazole compound of the formula:



4,013,442

PROCESS FOR ENCAPSULATING PARTICLES BY IN-SITU FORMATION OF A METAL CARBONATE COATING

Faisal T. Kawar, Somerville, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 796,231, Feb. 3, 1969, abandoned. This application May 10, 1971, Ser. No. 141,968

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C05C *9/00*

U.S. Cl. 71—28 **10 Claims**

1. A process for the encapsulation of particles by substantially water insoluble metallic carbonate salts comprising:

a. coating the particles with a finely divided solid material comprising the corresponding metal hydroxide of the metal carbonate; and

b. subjecting the coated particles to an atmosphere containing carbon dioxide for a time sufficient to at least substantially convert the hydroxide content of said coating to the corresponding carbonate.

4,013,443

METHOD OF PREPARING LIQUID FERTILIZER

Edwin Kaine Schuman, 100 W. 14th, Rolla, Mo. 65401

Filed Feb. 18, 1976, Ser. No. 659,148

Int. Cl.² C05D *1/02*

U.S. Cl. 71—31 **12 Claims**

1. A method of preparing a liquid fertilizer comprising the steps of:

a. dissolving a quantity of (K_2SO_4:2$MgSO_4$) in water at room temperature in a vessel connected to an agitator;

b. raising the solution slowly to a vigorous boil with frequent agitation for 10 to 15 minutes which reduces the volume by approximately 20% and dissolves approximately 80% of the (K_2SO_4:2$MgSO_4$);

c. removing the insolubles by decantation;

d. adding a quantity of Na_2HPO_4 to the admixture for reaction with the $MgSO_4$, the quantity of Na_2HPO_4 being in excess of the stoichiometric amount thereof reactable with the constituents of the admixture;

e. dissolving sufficient quantity of a dispersing agent selected from the group consisting of NaCl and KCl to the admixture to prevent agglomeration of the particles therein;

f. adding a quantity of NH_4NO_3 to the admixture for reaction with the constituents thereof, the quantity of said NH_4NO_3 added to the admixture being in excess of the stoichiometric amount thereof reactable with the constituents of the admixture, the quantities of said $MgSO_4$, Na_2HPO_4, and NH_4NO_3 added to the water being sufficient to produce an acidic, buffered saturated solution and suspension and

g. recovering the saturated solution and suspension after equilibrium conditions have been established and consisting substantially of Na_2SO_4, $MgHPO_4$, $MgNH_4PO_4$, Na_2HPO_4, NaH_2PO_4, NH_4NO_3, $NaNH_4HPO_4$, $(NH_4)_2SO_4$, $NaNO_3$, HNO_3, NH_4OH, the radicals $[HPO_4]^{--}$, $[H_2PO_4]^-$, ionic Na, free NH_3, H_2O and substantial amounts of K_2SO_4.

4,013,444

INHIBITING GRASS GROWTH WITH 5-ACETAMIDO-2,4-DIMETHYLTRIFLUOROMETHANESULFONANILIDE

Tomas L. Fridinger, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 331,676, Feb. 12, 1973, Pat. No. 3,894,078. This application June 19, 1975, Ser. No. 588,393

Int. Cl.² A01N *9/14*

U.S. Cl. 71—76 **2 Claims**

1. The method for inhibiting the rate of the growth of grass which comprises contacting grass with an effective amount of 5-acetamido-2,4-dimethyltrifluoro-methanesulfonanilide or a horticulturally acceptable salt thereof.

4,013,445

1-(BIS-TRIFLUOROMETHYLPHENYL)-2-OXO-PYRROLIDINE-4-CARBOXYLIC ACID DERIVATIVES, THEIR PRODUCTION AND THEIR USE AS PLANT-GROWTH REGULATORS AND HERBICIDES

Daniel Bellus, Riehen, and Werner Füry, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

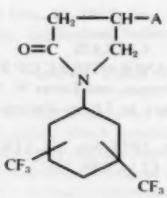
Filed Oct. 23, 1975, Ser. No. 625,234

Claims priority, application Switzerland, Oct. 31, 1974, 14595/74

Int. Cl.² A01N *9/28*

U.S. Cl. 71—76 **8 Claims**

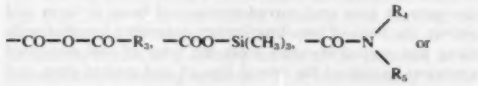
1. A 1-(bis-trifluoromethylphenyl)-2-oxo-pyrrolidine-4-carboxylic acid derivative of the formula I



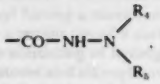
(I)

wherein

A represents a group $-COO^- H^+$, $-COOR_1$, $-COSR_2$, $-CN$, $-COCl$, $-COF$,



-continued



R_1 represents a mono- to trivalent metal cation of an inorganic or organic amine cation or quaternary ammonium cation, C_1–C_{18}-alkyl, C_1–C_{18} alkyl substituted by halogen, hydroxyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, amino, mono- or di-(C_1–C_4) alkylamino, cyano, (C_1–C_4 alk)oxy-carbonyl, carbamoyl, tetrahydrofuryl, tetrahydropyranyl, or oxacyclopropyl; alkenyl, halogenoalkenyl, alkynyl, halogenoalkynyl having 3 to 8 carbon atoms, cycloalkyl having 3 to 12 ring carbon atoms, phenyl, benzyl, phenethyl, or phenyl, benzyl or phenethyl substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, N-(C_1–C_4 alkyl) amino, N, N-(C_1–C_4) dialkylamino, halogen, trifluoromethyl, amino or nitro,

R_2 represents alkyl having 1 to 6 carbon atoms, phenyl, benzyl, or phenyl or benzyl substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, N-(C_1–C_4 alkyl) amino, N, N-(C_1–C_4) dialkylamino, halogen, trifluoromethyl, amino or nitro,

R_3 represents C_1–C_4-alkyl, C_1–C_4 alkyl substituted by at most 3 halogen atoms, or phenyl,

R_4 and R_5 each independently represent hydrogen, C_1–C_6 alkyl, C_1–C_6 alkyl substituted by halogen, hydroxyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, amino, mono- or di-(C_1–C_4)alkylamino, cyano, (C_1–C_4 alk)oxy-carbonyl, carbamoyl, tetrahydrofuryl, tetrahydropyranyl, or oxacyclopropyl; C_3–C_6-alkenyl, cycloalkyl having 3 to 8 ring carbon atoms, phenyl, phenyl substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, N-(C_1–C_4 alkyl) amino, N, N-(C_1–C_4) dialkylamino, halogen, trifluoromethyl, amino or nitro, or

R_4 and R_5 together with the adjacent nitrogen atom also represent a saturated 3- to 8-membered heterocyclic ring, and said ring substituted by C_1–C_4 alkyl.

8. Method for the regulation of plant growth, such as the inhibition of the growth or grasses and cereals, reduction of side shoots on tobacco plants, increase of the yield of soya beans, and the abscission of fruit, which comprises applying to the plant an effective amount of a pyrrolidine carboxylic acid derivative of the formula I of claim 1.

4,013,446

METHOD FOR PREVENTING CREASING IN CITRUS FRUIT

Aharon Beresky, Haifa, and Avigdor Bar-Akiva, Rishon Le-Zion, both of Israel, assignors to Fertilizers & Chemicals Ltd., Haifa, Israel

Filed Aug. 5, 1975, Ser. No. 602,170
Claims priority, application Israel, Dec. 20, 1974, 46307
Int. Cl.² A01N 9/36
U.S. Cl. 71—86 **3 Claims**

1. A method for a significant reduction of creasing in citrus fruit wherein an effective amount of an aqueous solution of urea phosphate is applied to the citrus fruit by foliar sprays.

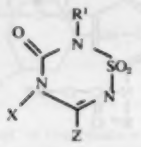
4,013,447

COMPOSITIONS CONTAINING HERBICIDAL THIATRIAZINONE DERIVATIVES AND USE THEREOF

Ian Trevor Kay, Wokingham, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 20, 1975, Ser. No. 551,290
Claims priority, application United Kingdom, Mar. 1, 1974, 9317/74
Int. Cl.² A01N 9/12
U.S. Cl. 71—91 **8 Claims**

1. A process of severely damaging or killing unwanted plants, which comprises applying to the locus area an effective amount of a thiatriazine compound of the formula



and salts thereof, wherein R^1 is cyclohexyl or an alkyl radical of up to 8 carbon atoms; X is a hydrogen atom or an alkyl group of 1 to 3 carbon atoms; and Z is a group R^2S— wherein R^2 is an alkyl group of 1 to 4 carbon atoms, or Z is a group —NR^3R^4 wherein R^3 is a hydrogen atom, an alkyl radical of 1 to 5 carbon atoms, or an alkanoyl radical of 2 to 5 carbon atoms, and R^4 is an alkyl radical of 1 to 5 carbon atoms.

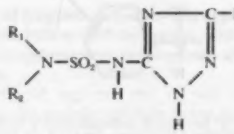
4,013,448

1,2,4-TRIAZOL-5-YL SULFAMIDES

Gerhard H. Alt, Creve Coeur, and James A. Klock, Overland, both of Md., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 29, 1975, Ser. No. 645,187
Int. Cl.² A01N 9/16; C07D 249/14; A01N 9/22
U.S. Cl. 71—92 **9 Claims**

1. A compound of the formula



wherein R_1 and R_2 are independently selected from the group consisting of hydrogen and lower alkyl.

4,013,449

METHOD OF CONTROLLING WEED GROWTH IN A PADDY FIELD

Tetsuo Takematsu; Makoto Konnai, both of Utsunomiya; Takayuki Isogawa, Tokyo, and Koshiro Kodama, Noshiro, all of Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,801
Claims priority, application Japan, July 12, 1974, 49-79091
Int. Cl.² A01N 9/24
U.S. Cl. 71—106 **7 Claims**

1. A method of removing annual weeds from a flooded paddy rice field which comprises applying to the flooded water from 20–50 g/are of 3,4-dichloropropionanilide and 0.2 – 2.5 g/are of β-naphthyl-N-methyl carbamate.

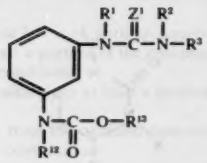
4,013,450

HERBICIDAL UREIDO CONTAINING CARBANILATES

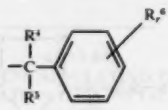
John F. Olin, Ballwin, and Philip C. Hamm, Glendale, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 77,677, Oct. 2, 1970, Pat. No. 3,867,426.
This application Feb. 11, 1975, Ser. No. 549,128
Int. Cl.² C07C 127/19
U.S. Cl. 71—111 **6 Claims**

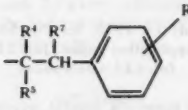
1. A meta-bifunctional substituted benzene having the formula



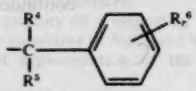
wherein Z^1 is selected from the group consisting of oxygen and sulfur; R^1 is selected from the group consisting of hydrogen, alkyl having a maximum of 8 carbon atoms and alkenyl having a maximum of 6 carbon atoms; R^2 is selected from the group consisting of hydrocarbyl selected from the group consisting of alkyl, alkenyl, alkynyl, and cycloalkyl said alkyl, alkenyl and alkynyl having a maximum of 12 carbon atoms and said cycloalkyl having 3 to 7 ring carbon atoms and a maximum of 4 chain carbon atoms, alkoxy having a maximum of 6 carbon atoms, chloroalkyl having a maximum of 6 carbon atoms and a maximum of 3 halogen atoms, chloroalkenyl having a maximum of 6 carbon atoms and a maximum of 3 halogen atoms, cycloalkenyl having 5 to 7 ring carbon atoms and a maximum of 4 chain carbon atoms, phenyl, substituted phenyl having a maximum of two substituents said substituents being selected from the group consistisng of halogen, nitro and alkyl having a maximum of 4 carbon atoms, the group



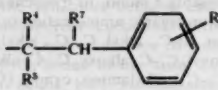
wherein R^4 and R^5 are each independently selected from the group consisting of hydrogen, alkyl having a maximum of 12 carbon atoms, alkenyl having a maximum of 3 carbon atoms, chloroalkyl having a maximum of 3 carbon atoms and a maximum of 3 halogen atoms, chloroalkenyl having a maximum of 3 carbon atoms and 3 halogen atoms, R^6 is selected from the group consisting of halogen, alkyl having a maximum of 14 carbon atoms, chloroalkyl having a maximum of 3 carbon atoms and a maximum of 3 halogen atoms, nitro, and alkoxy having a maximum of 3 carbon atoms; and r is one of the integers zero-to-three, the group



wherein R^7 is selected from the group consisting of alkyl and alkenyl each having a maximum of 4 carbon atoms, and R^4, R^5, R^6 and r are as previously defined; and R^3 is selected from the group consisting of hydrogen, alkyl having a maximum of 12 carbon atoms, and alkenyl having a maximum of 8 carbon atoms; R^{12} is selected from the group consisting of hydrogen, alkyl having a maximum of 6 carbon atoms and alkenyl having a maximum of 6 carbon atoms; and R^{13} is selected from the group consisting of alkyl having a maximum of 8 carbon atoms, alkenyl having a maximum of 6 carbon atoms, cycloalkyl having from 3 to 7 ring carbon atoms, cyclohexenyl, phenyl, substituted phenyl having a maximum of two substituents said substituents being selected from the group consisting of halogen, nitro and alkyl having a maximum of 4 carbon atoms, the group

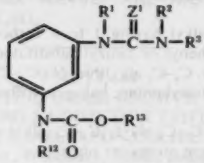


and the group

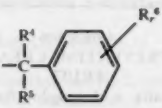


wherein R^4, R^5, R^6, R^7 and r are as previously defined.

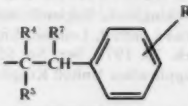
5. A herbicidal method which comprises applying to plants a herbicidal effective amount of a metal-bifunctional substituted benzene of the formula



wherein Z^1 is selected from the group consisting of oxygen and sulfur; R^1 is selected from the group consisting of hydrogen, alkyl having a maximum of 8 carbon atoms and alkenyl having a maximum of 6 carbon atoms; R^2 is selected from the group consisting of hydrocarbyl selected from the group consisting of alkyl, alkenyl, alkynyl and cycloalkyl said alkyl, alkenyl and alkynyl having a maximum of 12 carbon atoms and said cycloalkyl having 3 to 7 ring carbon atoms and a maximum of 4 chain carbon atoms, alkoxy having a maximum of 6 carbon atoms, chloroalkyl having a maximum of 6 carbon atoms and a maximum of 3 halogen atoms, chloroalkenyl having a maximum of 6 carbon atoms and a maximum of 3 halogen atoms, cycloalkenyl having 5 to 7 ring carbon atoms and a maximum of 4 chain carbon atoms, phenyl, substituted phenyl having a maximum of two substituents said substituents being selected from the group consisting of halogen, nitro and alkyl having a maximum of 4 carbon atoms, the group

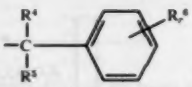


wherein R^4 and R^5 are each independently selected from the group consisting of hydrogen, alkyl having a maximum of 12 carbon atoms, alkenyl having a maximum of 3 carbon atoms, chloroalkyl having a maximum of 3 carbon atoms and a maximum of 3 halogen atoms, chloroalkenyl having a maximum of 3 carbon atoms and 3 halogen atoms, R^6 is selected from the group consisting of halogen, alkyl having a maximum of 14 carbon atoms, chloroalkyl having a maximum of 3 carbon atoms and a maximum of 3 halogen atoms, nitro, and alkoxy having a maximum of 3 carbon atoms; and r is one of the integers zero to three; the group

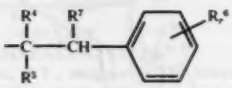


wherein R^7 is selected from the group consisting of alkyl and

alkenyl each having a maximum of 4 carbon atoms, and R^4, R^5, R^6 and r are as previously defined; and R^3 is selected from the group consisting of hydrogen, alkyl having a maximum of 12 carbon atoms, and alkenyl having a maximum of 8 carbon atoms; R^{12} is selected from the group consisting of hydrogen, alkyl having a maximum of 6 carbon atoms and alkenyl having a maximum of 6 carbon atoms; and R^{13} is selected from the group consisting of alkyl having a maximum of 8 carbon atoms, alkenyl having a maximum of 6 carbon atoms, cycloalkyl having from 3 to 7 ring carbon atoms, cyclohexenyl, phenyl, substituted phenyl having a maximum of two substituents said substituents being selected from the group consisting of halogen, nitro and alkyl having a maximum of 4 carbon atoms, the group



and the group



wherein R^4, R^5, R^6, R^7 and r are as previously defined.

4,013,451

HERBICIDAL COMPOSITIONS FOR KILLING WEEDS IN VINEYARDS

Pierre Poignant; Guy Borrod, and Raymond Richard, all of Lyon, France, assignors to Philagro S.A., Lyon, France

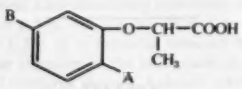
Filed Sept. 5, 1975, Ser. No. 610,865

Claims priority, application France, Sept. 20, 1974, 74.32560

Int. Cl.² A01N 9/24

U.S. Cl. 71—116 **10 Claims**

1. A method of killing dicotyledon weeds in vineyards, comprising contacting said weeds with a quantity sufficient to kill said weeds of at least one compound of the formula



wherein A is CH_3 or Cl; B is H where A is CH_3 or B is H or Cl where A is Cl, or a simple derivative thereof.

4,013,452

UREA DERIVATIVES AND THEIR USE AS HERBICIDES

Otto Scherer, Bad Soden, Taunus; Gerhard Horlein, Frankfurt am Main, and Hubert Schonowsky, Neu-Isenburg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

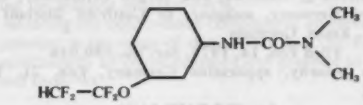
Division of Ser. No. 40,704, May 26, 1970, Pat. No. 3,937,726, which is a continuation-in-part of Ser. No. 628,843, April 6, 1967, abandoned, and Ser. No. 799,088, Feb. 13, 1969, abandoned, and Ser. No. 800,748, Feb. 19, 1969, abandoned.

This application July 21, 1975, Ser. No. 597,671

Int. Cl.² A01N 9/20

U.S. Cl. 71—120 **4 Claims**

1. A herbicidal preparation containing an effective amount of



as the active ingredient, in combination with an inert solid or liquid carrier, a solvent, adhesive, wetting agent, dispersing agent or grinding auxiliary.

4,013,453

FLAME SPRAY POWDER FOR WEAR RESISTANT ALLOY COATING CONTAINING TUNGSTEN CARBIDE

Mahesh S. Patel, Albertson, N.Y., assignor to Eutectic Corporation, Flushing, N.Y.

Filed July 11, 1975, Ser. No. 594,943

Int. Cl.² C23C 7/00

U.S. Cl. 75—.5 R **12 Claims**

1. A composition of matter in the form of a powder mixture for use in the hard facing of metal substrates comprising a nickel-base alloy powder having substantially uniformly blended therewith a powder comprising agglomerates of nickel powder intimately combined with tungsten carbide powder,

the amount of tungsten carbide in said agglomerates ranging from about 70% to 90% by weight, with the nickel powder in said agglomerates ranging from about 30% to 10% by weight,

the ratio of said agglomerates to said nickel-base alloy powder in the powder mixture being such that the total mixture has an average tungsten carbide content ranging from about 10% to 30% by weight of said mixture,

the composition of said nickel-base alloy powder in said mixture comprising by weight about 2.5% to 20% Cr, about 0.5% to 6% Si, about 0.5% to 5% B, up to about 10% Fe and the balance essentially nickel.

4,013,454

COPRODUCTION OF IRON WITH METHANOL AND AMMONIA

Robert Kenneth Jordan, Carlton House, Suite 1431, 550 Grant St., Pittsburgh, Pa. 15219

Filed Mar. 4, 1975, Ser. No. 555,159

Int. Cl.² C21B 5/00, 3/04

U.S. Cl. 75—41 **2 Claims**

1. A process for the production of ferrous metal and methanol comprising,

a. operating a ferrous blast furnace using a carbonaceous fuel and combusted with a gas containing oxygen and carbon dioxide to produce ferrous metal and top gas containing carbon monoxide and carbon dioxide,

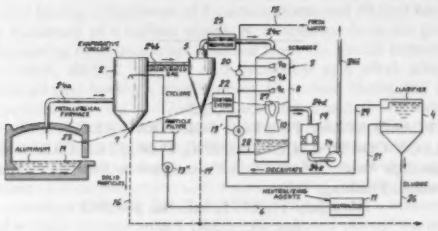
b. shifting the top gas from said ferrous blast furnace with steam to convert at least a part of the contained carbon monoxide to a gas containing carbon monoxide, carbon dioxide and hydrogen,

c. removing carbon dioxide from the shifted gas by a solvent based carbon dioxide removal process to produce a synthesis gas containing hydrogen, carbon monoxide and carbon dioxide, reacting said synthesis gas in a hydrogenation reactor to produce methanol.

4,013,455
METHOD OF AND APPARATUS FOR TREATING A NONFERROUS METAL

Ulrich Kleeberg, Mulheim, and Jurgen Leimkuhler, Essen, both of Germany, assignors to Gottfried Bischoff Bau kompl., Essen, Germany

Filed Feb. 14, 1975, Ser. No. 550,016
Claims priority, application Germany, Feb. 21, 1974, 2408222
Int. Cl.[2] C22B *21/00*
U.S. Cl. 75—68 R 7 Claims



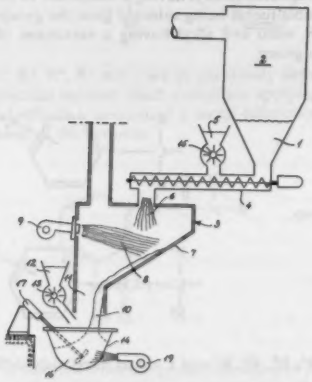
1. A method of treating a nonferrous metal comprising the steps of:
heating a nonferrous metal in a metallurgical furnace to melt said metal and produce a hot impurity-bearing gas;
evaporatively cooling said gas with a cooling liquid;
thereafter separating particles from said gas in a dry process;
maintaining said gas above its dewpoint during evaporative cooling of said gas and particle separation therefrom;
thereafter contacting said gas with a scrubbing liquid to scrub said gas and produce a scrubbing liquor;
clarifying said liquor to produce a decantate and a sludge;
recirculating said decantate for use as scrubbing liquid;
neutralizing said sludge; and
recirculating the neutralized sludge and using same as at least part of said cooling liquid, whereby impurities in said gas are dissolved in said scrubbing liquid and separated out as crystals during the dry particle separation step.

3. An apparatus for treating a nonferrous metal comprising:
a metallurgical furnace for melting a nonferrous metal and producing a hot gas;
a conduit defining a flow path for said gas;
means in said conduit for evaporatively cooling said gas with a cooling liquid;
dry separator means downstream of the evaporative cooling means of said conduit for separating particles from said gas in a dry process;
scrubbing means including an annular gap washer downstream of said filter means in said conduit for contacting said gas with a scrubbing liquid for scrubbing said gas and producing a scrubbing liquor;
clarifying means connected to said scrubbing means for reducing said liquor to a decantate and a sludge;
means for feeding said decantate into said scrubbing means as said scrubbing liquid;
means connected to said clarifying means for neutralizing said sludge; and
means connected to the neutralizing means for feeding the neutralized sludge back to said evaporative-cooler means as at least part of said cooling liquid.

4,013,456
METHOD FOR TREATING FLUE DUST CONTAINING LEAD

Svend Bergsoe, Astrup, Denmark, assignor to Paul Bergsoe & Son a/s, Glostrup, Denmark

Filed June 4, 1975, Ser. No. 583,473
Claims priority, application Denmark, June 12, 1974, 3141/74
Int. Cl.[2] C22B *13/00*
U.S. Cl. 75—77 10 Claims



1. A method of recovering metal from flue dust having lead oxide therein, comprising the steps of:
heating and fusing the flue dust to a molten and substantially fluid mass in a fusing furnace without substantial simultaneous reduction;
adding a pre-treating material prior to cooling said substantially fluid mass for facilitating the recovery of metal from said flue dust;
cooling the mass until said mass solidifies;
forming and preparing said solidified mass for charging into a metallurgical furnace;
charging said prepared mass into said metallurgical furnace; and
smelting and reducing said prepared mass in said metallurgical furnace.

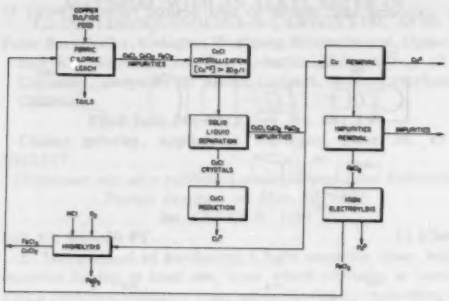
4,013,457
PROCESS FOR THE RECOVERY OF CUPROUS CHLORIDE IN THE PRESENCE OF METAL IMPURITIES

Duane N. Goens, and Paul R. Kruesi, both of Golden, Colo., assignors to Cyprus Metallurgical Processes Corporation, Los Angeles, Calif.

Filed Feb. 24, 1975, Ser. No. 552,694
Int. Cl.[2] C22B *3/00*; C01G *3/04*
U.S. Cl. 75—104 25 Claims

10. In a process for recovering copper from copper sulfide ores and concentrates containing at least one metal impurity selected from the group consisting of antimony, bismuth, and arsenic comprising leaching the copper sulfides to product a leach solution emprising cuprous chloride, cupric chloride, ferrous chloride and the metal impurities; separating at least a portion of the cuprous chloride from the metal impurities and leach solution resulting in cuprous chloride crystals and a mother liquor; separating the cuprous chloride crystals from the mother liquor; reducing the crystallized cuprous chloride to elemental copper; treating a portion of the mother liquor with oxygen in order to produce iron oxide, cupric chloride and ferric chloride, and treating the remainder of the mother

liquor in order to remove the impurities; the improvement comprising performing the cuprous chloride separation by



crystallization in the presence of cupric ion being maintained in a concentration of at least about 20 grams per liter.

4,013,458

CAST MARAGING STEEL

Stephen Floreen, Suffern, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 479,812, June 17, 1974, abandoned. This application Dec. 30, 1975, Ser. No. 645,451

Int. Cl.² C22C *38/06, 38/08, 38/10*

U.S. Cl. 75—124 **5 Claims**

1. An air-melted maraging steel in cast form having a yield strength in excess of 175,000 psi, together with good ductility and toughness consisting of about 15 to 19% nickel, from 9 to about 11% cobalt, about 1.5 to 2.5% molybdenum, 0.01 to 0.1% of each of aluminum and titanium, from 0.3 to 0.6% silicon, and up to 0.1% carbon, the balance being essentially iron.

4,013,459

OXIDATION RESISTANT NICKEL BASE ALLOYS

Mathur Raghavan, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Oct. 24, 1975, Ser. No. 625,553

Int. Cl.² C22C *19/05*

U.S. Cl. 75—171 **10 Claims**

1. A nickel base alloy consisting essentially of from 2 to 6% aluminum, from 0.5 to 4% silicon, from 1 to 6% chromium, from 0.001 to 0.5% of a material selected from the group consisting of the elements of the lanthanide series of the Periodic Table and mixtures thereof, balance essentially nickel.

4,013,460

PROCESS FOR PREPARING CEMENTED TUNGSTEN CARBIDE

Charles M. Brown, and Harry J. Brown, both of Lewiston, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 236,608, March 21, 1972, abandoned. This application Sept. 6, 1973, Ser. No. 394,618

Int. Cl.² B22H *1/04;* **C22C** *1/05, 29/00*

U.S. Cl. 75—204 **4 Claims**

1. A method for producing cemented tungsten carbide compositions which comprises

i. providing a mixture of finely divided elemental tungsten, elemental cobalt and graphite, the amounts of tungsten and graphite in the mixture being in substantially stoichiometric proportions for the production of WC and the amount of cobalt being from about 3 to 20% by weight of the mixture of tungsten, graphite and cobalt,

ii. ball milling the mixture of tungsten, cobalt and graphite, said ball milling being only for a time until at least about 96 percent of optimum density is first provided in green compacts cold pressed from said mixture,

iii. terminating the ball milling at such time and cold pressing the mixture into compacts,

iv. sintering the cold pressed compacts at an elevated temperature in the range of about 1350° to 1550° C to cause substantially all of the tungsten and graphite to combine and form WC.

4,013,461

HIGH VOID POROUS SHEET AND PROCESS THEREFOR

Raymond John Elbert, Middleburg Heights, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 164,516, July 21, 1971. This application May 8, 1975, Ser. No. 575,734

Int. Cl.² B22F *3/18*

U.S. Cl. 75—212 **9 Claims**

1. A process for fabricating high void, porous sheets comprising the following steps:

a. preparing hollow carbonaceous particles having a diameter no greater than 0.030 inch;

b. depositing a metallic layer on said particles, said metallic layer being non-reactant with said particles at the sintering temperature of the metallic material;

c. preparing a green sheet consisting of said metallic coated hollow particles;

d. heating said green sheet above the sintering temperature of said metallic material so as to bond said material thereby producing a high void, porous sheet;

e. depositing a melting point depressant on said sintered porous sheet; and

f. heating said coated sintered sheet to a temperature sufficient to cause liquid phase sintering.

4,013,462

MIGRATION IMAGING SYSTEM

William L. Goffe, Webster; Joseph Mammino, Penfield, and Joan R. Ewing, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 634,757, April 28, 1967, abandoned. This application June 30, 1969, Ser. No. 837,591

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 PS **15 Claims**

1. An imaging method comprising:

a. providing an imaging member comprising a layer of softenable material having migration marking material dispersed throughout said softenable material, said softenable material capable of having its resistance to migration of migration marking material decreased sufficiently to allow migration of migration marking material in depth in said softenable material;

b. applying an electrical latent image to said migration marking material; and

c. developing said imaging member by decreasing the resistance of said softenable layer to migration of migration marking material in depth in the layer of softenable material at least sufficient to allow imagewise migration of migration marking material subject to said migration force at least in depth of said softenable layer.

4,013,463

PHOTORECEPTOR FABRICATION UTILIZING AC ION PLATING

Lewis B. Leder, 1400 East Ave., Rochester, N.Y. 14610

Filed Aug. 15, 1975, Ser. No. 605,134

Int. Cl.² G03G *5/04*

U.S. Cl. 96—1.5 **19 Claims**

1. A method for obtaining flexible photoreceptors having improved durability and adhesion between components thereof comprising a flexible metal- or metal-coated substrate and an inorganic ambipolar ionizable photoconductive layer in charge-blocking contact with the substrate, comprising

initially bombarding the substrate as an electrode under DC or low frequency AC glow discharge under vacuum with ions of an inert non-metallic gas in the presence of available added or residual atmosphere oxygen; and

exposing the resulting oxidized substrate as an electrode to a vapor cloud from a donor source comprising positive and negative ions of desired ambipolar photoconductive material, ions of the inert non-metallic gas comprising the glow discharge, and uncharged vaporized photoconductor material; in or adjacent to a low frequency AC electrical field utilizing the donor source of the vapor cloud of photoconductive material or adjacent structure as an additional electrode.

4,013,464

PHOTOCONDUCTIVE AND RADIOCONDUCTIVE COMPOSITIONS AND ELEMENTS CONTAINING TETRAGONAL LEAD MONOXIDE

William A. Light, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,422
Int. Cl.² G03G *5/04*
U.S. Cl. 96—1.5 **9 Claims**

1. A photoconductive and radioconductive insulating composition comprising tetragonal lead monoxide, a binder selected from the group consisting of polyvinylacetate, polyvinylformal and polyvinylbutyral and an anhydride capable of inhibiting dark conductivity in the composition, said anhydride present in effective amount less than about 4 percent of the weight of the lead oxide in the composition.

4,013,465

REDUCING THE REFLECTANCE OF SURFACES TO RADIATION

Peter Brian Clapham, Chertsey, and Michael Christopher Hutley, Hanworth, both of England, assignors to Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Continuation of Ser. No. 467,354, May 6, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,757
Int. Cl.² G03C *5/00, 5/04*
U.S. Cl. 96—36 **16 Claims**

1. A photo-exposure method for reducing the reflectance of a surface to electromagnetic radiation in a predetermined wavelength band which comprises applying a layer of photosensitive material to said surface, exposing the photosensitive layer to a regular pattern of light to which it is sensitive, and processing the exposed photosensitive layer to convert the effect of said light pattern on said photosensitive layer into a regular array of protuberances on said surface having a height which is not less than one third of the length of the longest wavelength in the band and at a spacing between adjacent protuberances which is less than the length of the shortest wavelength of the band divided by the refractive index of the material of which the protuberances consist.

4,013,466

METHOD OF PREPARING A CIRCUIT UTILIZING A LIQUID CRYSTAL ARTWORK MASTER

Robert James Klaiber, Hopewell Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

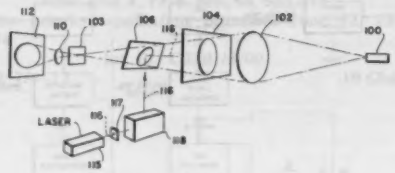
Filed June 26, 1975, Ser. No. 590,766
Int. Cl.² G03C *5/00, 5/04*
U.S. Cl. 96—36 **12 Claims**

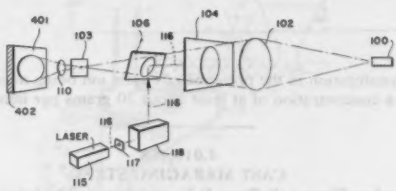
1. A method of forming a circuit mask which comprises:

a. heating a selected portion of a cell comprising a liquid crystal above the transition temperature of said crystal to form an artwork master having a pattern formed therein capable of transmitting a desired radiant energy therethrough in an imagewise manner;

b. positioning a member, having a surface sensitive to said desired radiant energy, in a desired spatial relationship with said master;

c. exposing said master to said desired radiant energy to





transmit said radiant energy through said pattern to form a radiation-exposed pattern on said sensitive surface; and

d. treating said exposed sensitive surface to form a pattern capable of transmitting radiant energy therethrough to form the circuit mask.

4,013,467

METHOD OF MANUFACTURING COLOR PICTURE TUBES USING ROTATING LIGHT ATTENUATOR

Kakuichiro Hosokoshi, Neyagawa, and Osamu Yoshida, Kyoto, both of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Division of Ser. No. 264,356, June 19, 1972, Pat. No. 3,906,515. This application June 5, 1975, Ser. No. 584,067
Claims priority, application Japan, June 18, 1971, 46-44414
Int. Cl.² G03C *5/00*
U.S. Cl. 96—36.1 **1 Claim**

1. In a method of manufacturing a color screen for a color picture tube including the steps of:

coating a photosensitive film on the inner surface of a face panel of the tube,

securing a shadow mask to the inner surface of the facepanel with a specified gap in between, and

exposing the photosensitive film through apertures of the shadow mask, a light-attenuator and a path-refracting lens to light beams emitted from a point-light source positioned at an off-center position of the axis of the face panel, said light-attenuator controlling exposures at the photosensitive film being located between the lens and the shadow mask in closer proximity to the shadow mask,

the improvement that the light-attenuator is semitransparent with a specified distribution of light-transmission and rotates around an axis at its center during the light-exposure step, and that the distance between said point-light source and said light-attenuator is more than 1.5 times the distance between said point-light source and said refracting lens.

4,013,468

METHOD OF HARDENING A PROTEIN-CONTAINING LAYER OF A SILVER HALIDE PHOTOGRAPHIC MATERIAL WITH AN ALKYL ESTER OF 1,2-DIHYDROQUINOLINE-N-CARBOXYLIC ACID

Peter Bergthaller, Cologne; Wolfgang Himmelmann, Opladen, and Karl-Wilhelm Schranz, Odenthal-Hahnenberg, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed June 20, 1974, Ser. No. 481,190

Claims priority, application Germany, June 26, 1973, 2332317

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² G03C *1/30*

U.S. Cl. 96—50 PT 11 Claims

1. The method of hardening a light sensitive silver halide material having at least one layer which contains at least in part a protein-containing hydrophilic binder by contacting the protein-containing hydrophilic binder with an effective amount of a hardening compound to cause a crosslinking reaction of the protein molecules in the binder the improvement according to which the hardening compound is an alkyl ester of carboxylic acid selected of 1,2-dihydroquinoline-N-carboxylic acid and 1,2-dihydroisoquinoline-N-carboxylic acid, the 1,2-dihydroquinoline nucleus of which being alkoxy substituted in its 2-position and the 1,2-dihydroisoquinoline nucleus of which being alkoxy substituted in its 1-position.

4,013,469

CHEMICAL DEVELOPMENT OF A SILVER HALIDE EMULSION CONTAINING AN ARYLONIUM SALT ON A POLYESTER FILM SUPPORT

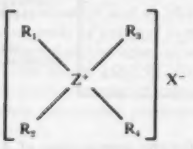
Teruhide Haga, 145, 2-Chome, Ogikubo, Suginami, Tokyo; Koichi Horigome, 1407, 2-Chome, Kami-Shakujii, Nerima, Tokyo, and Mitsuo Ebisawa, 449, Kamikawa-cho, Hachioji, Tokyo, all of Japan

Continuation of Ser. No. 486,582, July 5, 1974, abandoned, which is a continuation of Ser. No. 277,587, Aug. 2, 1972, abandoned, which is a continuation of Ser. No. 60,108, July 31, 1970, abandoned. This application Feb. 6, 1976, Ser. No. 656,083

Int. Cl.² G03C *5/24, 1/34, 1/78*

U.S. Cl. 96—63 4 Claims

1. A process for forming a silver image in a light-sensitive silver halide photographic material comprising a polyester film support, one or more layers on said support, including a silver halide emulsion layer and, incorporated in at least one of said layers, an antifogging amount of a compound having the formula



wherein R_1, R_2, R_3, and R_4 are individually benzyl, phenyl, naphthyl or C_1 to C_{12} - alkyl phenyl group; Z is N, P, As or Sb; and X is an anion, said process comprising the steps of imagewise exposing said light-sensitive silver halide photographic material to light and developing the exposed material essentially only by treating with an aqueous silver halide developer.

4,013,470

WARM IMAGE TONE PROVIDING PHOTOGRAPHIC ELEMENT

John T. Landon, Jr., Sao Paulo, Brazil, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,248

Claims priority, application United Kingdom, May 29, 1975, 23478/75

Int. Cl.² G03C *1/06, 1/02*

U.S. Cl. 96—95 16 Claims

1. A photographic element containing an incorporated developing agent and which forms a warm image tone photographic print upon successive processing in an akaline activator bath and a stabilizer bath, said element comprising

a white reflective non-porous support,

a silver halide emulsion layer which forms a viewable continuous tone silver image therein upon processing, wherein said silver halide is comprised of greater than 50 mole percent chloride, up to 5 mole percent iodide and the remainder bromide based on total halide, said layer additionally containing from 1 to 20 grams per mole of silver halide of an azaindene antifoggant, and

in said emulsion layer or in a layer adjacent thereto, a mixture of from 1 to 10 mg per 0.1 meter² of a quaternary ammonium salt and from 1 to 10 mg per 0.1 meter² of a silver salt of a heterocyclic mercaptan represented by the general formula

wherein

Q represents the atoms necessary to complete a five-or six-membered heterocyclic ring.

4,013,471

DEVELOPMENT OF PHOTOGRAPHIC SILVER HALIDE ELEMENTS

Robert Joseph Pollet, Vremde; Camille Angelina Vandeputte, Mortsel; Francis Jeanne Sels, Kontich; Gerard Laurens Vanreusel, Hove; Jozef Frans Willems, Wilrijk, and George Frans van Veelen, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Nov. 20, 1973, Ser. No. 417,498

Claims priority, application United Kingdom, Dec. 7, 1972, 56630/72

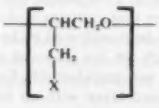
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G03C *5/30, 1/72, 1/28, 1/06*

U.S. Cl. 96—66.3 22 Claims

1. A method of developing a photographic element containing developable silver halide, said method including having a polyoxyethylene compound present in the element or in the developer bath during development, said polyoxyethylene compound comprising from about 20 to 100 mole percent recurring units of the formula:

and 80 to 0 mole percent recurring units of the formula:



wherein R represents an aliphatic, aromatic, or heterocyclic group, and X is halogen.

4,013,472

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Ikutaro Horie, and Kameji Nagao, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 16, 1975, Ser. No. 541,467

Claims priority, application Japan, Jan. 16, 1974, 49-8123

Int. Cl.² G03C *1/76*

U.S. Cl. 96—67 **7 Claims**

1. A photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion layer and a surface disposed upon a silver halide emulsion layer consisting essentially of a binder containing an inorganic materials of which the main component is alumina-magnesium silicate having the following composition

SiO_2	about 30	– about 90 wt %
MgO	about 1	– about 40 wt %
Al_2O_3	about 0.5	– about 20 wt %

wherein the total of their contents is in the range of about 70 to 100 wt%, said inorganic material having a particle size when dispersed in water about 0.3 to 10 microns.

4,013,473

RECORDING MATERIALS AND IMAGE RECEIVING MATERIALS FOR PRODUCING COPIES IN A DRY WAY

Jozef Frans Willems, Wilrijk; Albert Lucien Poot, Kontich; Jan Frans Van Besauw, Mortsel, all of Belgium; Alfons Klein, Dusseldorf, and Karlfried Wedemeyer, Cologne-Stammheim, both of Germany, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

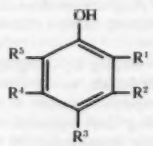
Filed Aug. 21, 1975, Ser. No. 606,489

Claims priority, application Germany, Aug. 24, 1974, 2440678

Int. Cl.² G03C *1/42, 5/30*

U.S. Cl. 96—114.1 **13 Claims**

1. Thermographic recording material or image-receiving material for dry copying processes comprising at least one layer and a substantially non-photosensitive reducible silver salt, a reducing agent, and optionally a toning agent or toning mixture, wherein the reducing agent corresponds to the following general formula:



wherein:

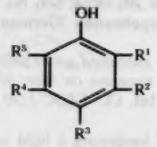
at least one of R^1 and R^5 represents a cyclopentyl group and the other, if any, represents hydrogen,

R^2 represents a lower alkyl group containing 1–4 carbon atoms,

R^3 represents hydrogen or a lower alkyl group containing 1–4 carbon atoms, and

R^4 represents hydrogen.

12. Photographic recording process for the production of a visible silver image by (1) the image-wise exposure of a material comprising a layer that contains a photo-oxidizable reducing agent, which can be transferred by heat, and a photosensitive substance, which on the exposed areas transforms the reducing agent in a non-transferrable form by oxidation, (2) contacting the exposed layer with an image-receiving layer, which contains a substantially non-photosensitive silver salt, optionally a toning agent and a reducing agent, and (3) overall heating the contacting layers, the photo-oxidizable reducing agent being transferred from the non-exposed layers of the photosensitive layer into the image-receiving layer wherein the image-wise reduction of the substantially non-photosensitive silver salt takes place in the presence of a phenol derivative of the following formula:



wherein:

at least one of R^1 and R^5 represents a cyclopentyl group and the other, if any, represents hydrogen,

R^2 represents a lower alkyl group containing 1–4 carbon atoms,

R^3 represents hydrogen or a lower alkyl group containing 1–4 carbon atoms, and

R^4 represents hydrogen.

4,013,474

WOOD PRESERVATIVE COMPOSITIONS

Leonard Teitell, and Sidney H. Ross, both of Philadelphia, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 6, 1975, Ser. No. 575,100

Int. Cl.² C09K *3/18;* **C09D** *5/14*

U.S. Cl. 106—2 **2 Claims**

1. A durable decay resistant preservative formulation for use with wooden products which must withstand severe tropical humidities in excess of 18 months, said formulation consisting of:

5.0 parts by weight pentachlorophenol

10.0 parts by weight gamma-aminopropyltriethoxysilane

0.5 parts by weight water

84.5 parts by weight 2-butoxyethanol

4,013,475

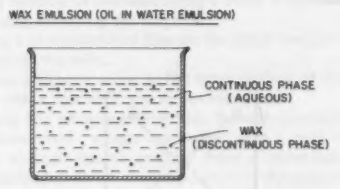
POLISH

Marvin Liebowitz, Edison, and Eugene Howard Brandli, Somerset, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Sept. 27, 1974, Ser. No. 510,033

Int. Cl.² C09G *1/12*

U.S. Cl. 106—10 **21 Claims**



1. A process for the preparation of a stable water-in-oil double emulsion useful for treating hard surfaces which comprises intimately mixing

A. a homogeneous organic solvent solution comprising (1) from about 0.05 to 9% of organopolysiloxane having a viscosity of from about 20 to 15,000 centistokes, (2) from about 5 to 50% of organic solvent having an aniline point of from about −22° to 185° F and a distillation range of

from about 190° to 460° F, said solvent being substantially completely miscible with said organopolysiloxane and (3) an effective amount of water-in-oil emulsifier, the concentration being based upon final product emulsion with

B. an oil-in-water emulsion composition comprising as the discontinuous phase, wax particles having a particle size of from about 0.1 to 5 μ substantially uniformly dispersed throughout a continuous aqueous phase, the concentration of wax in said oil-in-water emulsion being from about 1 to 50%,

whereby to form a water-in-oil emulsion composition wherein (A) forms the continuous phase and (B) forms the discontinuous phase, the latter comprising dispersed aqueous particles containing said wax uniformly dispersed therein and wherein the proportions of (A) and (B) are such as to provide a total wax concentration in the final product of from about 0.1 and 5%.

4,013,476

NON-COMBUSTIBLE MOLDING MATERIAL

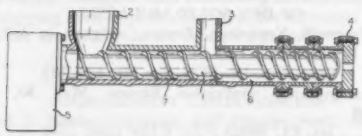
Harutoshi Ueda, Osaka; Naoyuki Suzuki, Nara, and Masami Nagao, Takatsuki, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 406,611, Oct. 15, 1973, Pat. No. 3,945,840, Continuation-in-part of Ser. No. 183,077, Sept. 23, 1971, abandoned. This application Sept. 30, 1974, Ser. No. 510,869

Claims priority, application Japan, Sept. 24, 1970, 45-84199; Sept. 24, 1970, 45-84200; Sept. 25, 1970, 45-84468; Oct. 22, 1970, 45-93321; Nov. 16, 1970, 45-101231; Dec. 28, 1970, 45-126941; Dec. 29, 1970, 45-124120

Int. Cl.² C09D *5/18;* **C04B** *43/02*

U.S. Cl. 106—15 FP **9 Claims**



1. A non-combustible molding composition which is capable of hardening after being dehydrated to a moisture content of 5 to 50 % by weight consisting essentially of:

a. 100 parts by weight of a hydraulic inorganic mixture consisting of an inorganic substance composed predominantly of silica selected from the group consisting of quartz rock, silica sand, aplite, pottery stone, silicate terra alba, diaspore, diatomaceous earth, fly ash, perlite, obsidian perlite, pumice microballoon, foamed shale pumice, foamed clay and vermiculite; and an inorganic substance composed predominantly of calcium oxide selected from the group consisting of slaked lime, quick lime and calcium carbonate, the molar ratio of the inorganic substance composed predominantly of calcium oxide to the inorganic substance composed predominantly of silica being from 0.5 to 1.2;

b. 10 to 200 parts by weight of mineral fibers selected from chrysotile asbestos, amosite asbestos, crocidolite asbestos, amphibole asbestos, tremolite asbestos, actinolite asbestos, rock wool, glass fiber and slag wool; and

c. 1 to 10 parts of vanadium oxide selected from the group consisting of vanadium pentoxide, vanadium sesquioxide, vanadium dioxide, vanadium monoxide, sodium metavanadate and ammonium metavanadate.

4,013,477

METHOD FOR PREPARING DENSE, β-ALUMINA CERAMIC BODIES

Arun D. Jatkar; Ivan B. Cutler; Anil V. Virkar, and Ronald S. Gordon, all of Salt Lake City, Utah, assignors to The University of Utah, Salt Lake City, Utah

Filed July 30, 1975, Ser. No. 600,260

Int. Cl.² C04B *35/10*

U.S. Cl. 106—73.4 **4 Claims**

1. In a process for forming a β''-alumina containing ceramic body comprising

A. forming a green ceramic body from a matrix powder which is of a composition consistent with the formation of β''-alumina upon sintering and

B. sintering said green ceramic body at a temperature and for a time necessary to achieve the desired final density and convert said composition to β''-alumina,

the improvement comprising mechanically mixing said matrix powder, with β''-alumina seed crystals prior to forming said green ceramic body, said seed crystals having a particle size up to 100 micrometers, the amount of said crystals ranging up to 50% by weight of said total mixture of seed crystals and matrix powder.

4,013,478

PROCESS FOR INCREASING RESISTANCE OF GLASS PRODUCTS TO CEMENT AND CEMENTITIOUS MIXTURES THEREOF

Helmut Meyer, Mainz-Gonsenheim, Germany, assignor to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed Jan. 24, 1975, Ser. No. 543,788

Claims priority, application Germany, Jan. 26, 1974, 2403751

Int. Cl.² C04B *7/02*

U.S. Cl. 106—98 **23 Claims**

1. In a process for making a reinforced Portland-type cement product, the steps comprising: (a) coating glass products useful for the reinforcement of said cement with an effective amount of a water-soluble zinc salt of a weak acid; and (b) incorporating said coated glass products into said cement.

4,013,479

AQUEOUS NATURAL RESINOID COMPOSITIONS

Arthur Biddle, 3405 Floyd Ave., Richmond, Va. 23221, and Alpheus Eugene Clonts, 325 N. Laburnum Ave., Richmond, Va. 23223

Filed May 23, 1975, Ser. No. 580,337

Int. Cl.² C08L *89/00, 93/02*

U.S. Cl. 106—133 **11 Claims**

1. A natural resin coating composition base comprising a liquid carrier base for said resin, a solubilizing agent for said resin, and vanillin in the presence of ammonia. The natural resin being a member of the plant, animal or mineral resinoid substances. Said vanillin being present in amounts to sufficiently eliminate obnoxious odors and poisonous effects of the fumes emitted by excess ammonia after the crosslinking action has taken place.

4,013,480
CELLULOSIC SIZING AGENTS

Lewis E. Chumbley; Lawrence L. Sams, II, both of Lake Jackson; Russell T. McFadden, Freeport; Juan Longoria, III, Lake Jackson, all of Tex.; Donald A. Tomalia, Midland, Mich.; Robert J. Thomas, Midland, Mich., and James W. Lalk, Shepherd, Mich., assignors to The Dow Chemical Company, Midland, Mich.

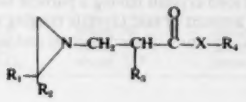
Continuation-in-part of Ser. No. 180,234, Sept. 13, 1971, abandoned, Ser. No. 323,373, Jan. 15, 1973, abandoned, and Ser. No. 323,374, Jan. 15, 1973, abandoned. This application Jan. 10, 1974, Ser. No. 432,265

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

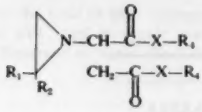
Int. Cl.[2] C08J *3/02*

U.S. Cl. 106—213 **27 Claims**

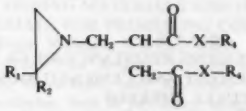
1. A mixture of (a) a ring-opened aziridinyl homopolymer of an aziridinyl monomer corresponding to the formula



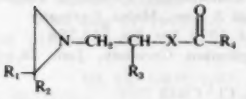
I



II



III or

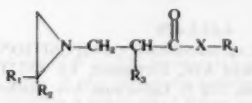


IV

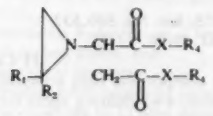
and (b) cationic starch,

wherein: X is oxygen or amido nitrogen, R_1 and R_2 are hydrogen or lower alkyl of from 1 to 4 carbon atoms, R_3 is hydrogen or methyl and R_4 is an organic hydrophobic group.

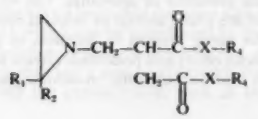
15. In the process of sizing cellulosics, the improvement consisting of applying to a cellulosic, in an amount sufficient to size same, a sizing agent comprising a ring-opened aziridinyl homopolymer of an aziridinyl monomer corresponding to the formula



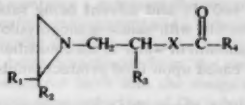
I



II



III or



IV

wherein: X is oxygen or amido nitrogen, R_1 and R_2 are hydrogen or lower alkyl of from 1 to 4 carbon atoms, R_3 is hydrogen or methyl and R_4 is an organic hydrophobic group.

4,013,481
PIGMENT FORMULATION

Hans-Heinz Mölls; Karlheinz Wolf, both of Leverkusen; Reinhold Hörnle, Cologne, all of Germany; Gottfried Popp, Charleston, S.C.; Konrad Nonn, Leverkusen, and Jürgen Spille, Schildgen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 4, 1972, Ser. No. 311,779

Claims priority, application Germany, Dec. 4, 1971, 2160208

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.[2] C09C *3/00*

U.S. Cl. 106—309 **12 Claims**

1. In the process of comminution of aqueous pigment dispersions or pigment pastes in the presence of a surface active agent; the improvement comprising utilizing as said surface-active agent in an amount of 0.1 to 50% relative to pigment, a surface-active agent which is saponifiable under acidic or alkaline conditions; following comminution, saponifying said surface active agent under acidic or alkaline conditions; and removing saponification products having solubility in water; the resulting pigment being free of surface-active agent.

4,013,482
PROCESS AND APPARATUS FOR THE MANUFACTURE OF DRY SOLID MOLASSES

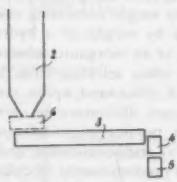
Pierre Jaconelli, Venissieux, France, assignor to A.V.D. A Votre Disposition, France

Filed Mar. 16, 1976, Ser. No. 667,282

Claims priority, application France, May 30, 1975, 75.17508

Int. Cl.[2] B01D *1/22*; **C13F** *1/00, 3/00*

U.S. Cl. 127—9 **16 Claims**



1. In the process for the manufacture of solid, dry molasses comprising drying the molasses and cooling and dividing the dried molasses, the improvement wherein said cooling and dividing step comprises:

cooling the molasses in a thin layer, immediately after said drying step, said layer being sufficiently thin in relation to the cooling temperature to allow the molasses to be cooled to the core thereof;

precrushing the cooled molasses to coarse particles, and

reducing the course particles to a powder by impact without crushing or significant friction.

4,013,483

METHOD OF ADJUSTING THE THRESHOLD VOLTAGE OF FIELD EFFECT TRANSISTORS

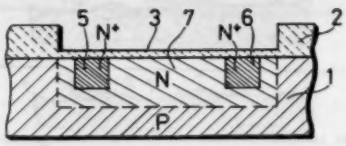
Gérard Nuzillat, and Christian Arnado, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed July 22, 1975, Ser. No. 598,165

Claims priority, application France, July 26, 1974, 74.26057

Int. Cl.² H01L 21/265

U.S. Cl. 148—1.5 5 Claims



1. A method of adjusting threshold voltages of field-effect transistors comprising the following steps:

i. starting from a semiconductor wafer having a first type of conductivity, manufacturing a plurality of production devices destined to become field-effect transistors, each possessing a source, a drain, a gate constituted by a metal compound, and a semiconductor region destined to become the channel of a field-effect transistor, and concommitant manufacturing, in the same wafer, of a monitoring device possessing a source, a drain, a gate constituted by said metal compound and a semiconductor region respectively of the same type as the source, drain, gate and semiconductor region of any production transistor, and an appendix electrically connected to the gate of said monitoring device, and eleotrically insulated from the source and drain of said monitoring device, said appendix being made of the same metal compound as said gates having dimensions which make it possible to contact it with measuring means;

ii. implanting ions in said wafer to modify the conductivity type of said regions, and concommitant measuring of the threshold voltage of said monitoring device, and

iii. stopping ionic implantation when the threshold voltage, in the monitoring device reaches a predetermined value.

4,013,484

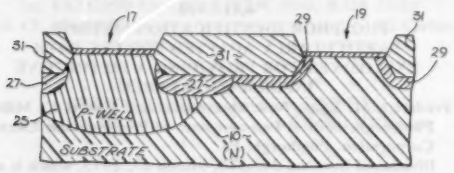
HIGH DENSITY CMOS PROCESS

Edward J. Boleky, Saratoga, and Charles Scott, Mountain View, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Feb. 25, 1976, Ser. No. 661,386

Int. Cl.² H01L 21/265

U.S. Cl. 148—1.5 20 Claims



1. On a silicon substrate which includes a first area for a first MOS device and a second spaced-apart area for a second MOS device, a process for forming channel stops of opposite conductivity type in the intermediate region between said first and second areas, comprising the steps of:

forming a masking member on said substrate, said masking member protecting a portion of said intermediate region;

doping the portion of said intermediate region unprotected by said masking member with a dopant of a first conductivity type to define a first channel stop;

removing said masking member;

doping said intermediate region with a dopant of a second conductivity type forming a second channel stop adjacent to said first channel stop;

whereby adjacent full channel stops may be fabricated in alignment with each other and with said first and second areas.

4,013,485

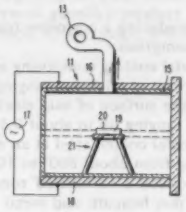
PROCESS FOR ELIMINATING UNDESIRABLE CHARGE CENTERS IN MIS DEVICES

Tso-Ping Ma, Mount Kisco, and William Hsioh-Lien Ma, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,368

Int. Cl.² H01L 21/263

U.S. Cl. 148—1.5 7 Claims



1. A process for restoring the electrical properties of radiation damaged semiconductor structures comprising treating the structures with a radio frequency field which is oriented substantially perpendicular to the structures in a substantially neutral atmosphere at reduced pressure.

4,013,486

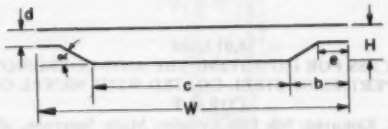
SPOT SCARFING NOZZLE FOR USE IN GANG ARRANGEMENT

Stephen August Engel, Shenorock, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Aug. 26, 1975, Ser. No. 607,887

Int. Cl.² B23K 7/06

U.S. Cl. 148—9.5 5 Claims



1. An oxygen discharge nozzle for selectively scarfing defects in a metal body while avoiding the formation of fins along the boundaries of the scarfing cut, said nozzle being suited for simultaneous side-by-side operation in combination with other like nozzles to produce scarfing cuts at least as wide as the width of said combined nozzles, said nozzle comprising: an oxygen gas passage terminating in a nozzle discharge orifice, said orifice being characterized by having a central section and at least one end section, the central section being defined by parallel upper and lower edges and being adapted to discharge a sheet-like stream of cutting oxygen of uniform intensity across the metal body to be scarfed, and the end section being defined by having at least one of its edges inclined such that the height of the end section of the discharge orifice is gradually reduced to a lesser value towards the side edge of the orifice but remaining greater than zero at said edge so as to diminish the intensity of the oxygen stream towards said edge of the orifice to the point where the flow of oxygen discharged at said edge is insufficient to scarf the workpiece but sufficient to produce a fin-free scarfing cut at least as wide

as the width of said nozzle, thereby allowing a plurality of said nozzles to operate side-by-side to produce a fin-free cut of preselected width.

4,013,487

NICKEL AND/OR COBALT-COATED STEEL WITH CARBURIZED INTERFACE

Lars H. Ramqvist; Nils Olle Grinder; Malte Sporrong, all of Nynashamn, and Per Enghag, Garphyttan, all of Sweden, assignors to Rederiaktiebolaget Nordstjernan, Sweden

Filed Mar. 4, 1975, Ser. No. 555,108
Claims priority, application Sweden, Mar. 14, 1974, 7403411
Int. Cl.² C23C 11/12; C25D 5/50
U.S. Cl. 148—16.5 5 Claims

1. A process for producing a corrosion resistant carburized steel article which comprises,

applying a first metal coating comprising a layer of metallic nickel and/or cobalt of thickness ranging from about 5 to 20 microns to the surface of said steel article having a carbon content ranging up to about 0.5% by weight,

carburizing said metal coated steel at an austenitizing temperature ranging from about 800° to 1000° C for a time sufficient to produce a carburized zone of thickness at least about 0.1 mm beneath said metal coating,

rapidly cooling said article from its austenitizing temperature to produce a martensitic structure in at least said carburized zone,

and then applying to said nickel and/or cobalt layer a second metal coating of over 2 microns thick of a metal selected from the group consisting of Cr, Sn, Pb, Zn, Cu and Cd,

said nickel and/or cobalt layer having been cleaned of any deposited carbon formed thereon during the carburization step,

whereby said article is characterized by an adherent first metal coating bonded to said steel and a second metal coating covering said first metal coating, said article being characterized further by improved resistance to corrosion and improved physical properties.

4,013,488

PROCESS FOR IMPROVING THE ANTI-CORROSION PROPERTIES OF STEEL COATED WITH NICKEL OR COBALT

Lars H. Ramqvist; Nils Olle Grinder; Malte Sporrong, all of Nynashamn, and Per Enghag, Garphyttan, all of Sweden, assignors to Rederiaktiebolaget Nordstjernan, Sweden

Claims priority, application Sweden, Mar. 14, 1974, 7403412
Filed Mar. 4, 1975, Ser. No. 555,286
Int. Cl.² C23C 17/00
U.S. Cl. 148—143 5 Claims

1. A process for improving the corrosion resistance of a steel article subject to corrosion which comprises,

plating said article with a first thin layer of at least one metal selected from the group consisting of nickel and cobalt over a thickness range of over about 2 to 50 microns,

heat treating said coated article in a protective or reducing atmosphere at an austenitizing temperature falling within the range of about 725° to 1000° C at substantially less than about 45 minutes,

and then applying a second thin layer of at least one metal selected from the group consisting of chromium, tin, lead, zinc, copper and cadmium to said first layer of a thickness of over about 2 to 50 microns,

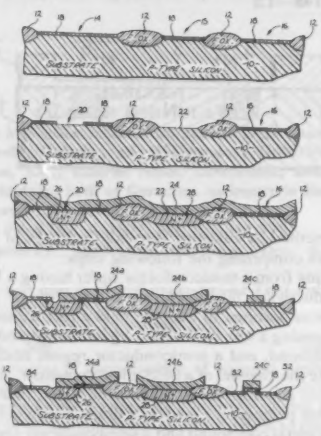
whereby a coated article is obtained characterized by improved resistance to corrosion.

4,013,489

PROCESS FOR FORMING A LOW RESISTANCE INTERCONNECT IN MOS N-CHANNEL SILICON GATE INTEGRATED CIRCUIT

William G. Oldham, El Cerrito, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Feb. 10, 1976, Ser. No. 656,933
Int. Cl.² H01L 21/225, 21/20, 27/02
U.S. Cl. 148—174 9 Claims



1. In an MOS process for fabricating n-channel, silicon gate devices on a silicon substrate, where a polycrystalline silicon layer is formed on an oxide layer and where said polycrystalline silicon layer is etched in predetermined patterns such that at least source and drain regions may be doped in said substrate in alignment with said predetermined patterns, an improvement in said process wherein a low resistance crossunder is formed at a proposed site in the substrate comprising:

removing said oxide layer at said proposed site of said crossunder prior to the formation of said polycrystalline silicon layer; and

doping said polycrystalline silicon layer prior to said etching of said layer;

whereby said polycrystalline silicon layer contacts said substrate at said site of said crossunder, thereby forming a low resistance crossunder in said substrate.

whereby said polycrystalline silicon layer directly contacts said substrate at said site of said crossunder, thereby forming a low resistance crossunder at the point of contact in said substrate.

4,013,490

PHOSPHOR IDENTIFICATION METHOD, PARTICULARLY ADAPTED FOR USE WITH EXPLOSIVES, FOR PROVIDING A DISTINCTIVE INFORMATION LABEL

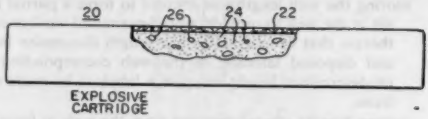
Frederick M. Ryan, New Alexandria, and Robert C. Miller, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 345,375, March 27, 1973, which is a division of Ser. No. 143,772, May 17, 1971, Pat. No. 3,772,099. This application Aug. 12, 1974, Ser. No. 496,672
Int. Cl.² C06B 45/00, 45/02, 39/00; C09K 3/00
U.S. Cl. 149—2 23 Claims

1. The method of providing explosive material with an individualistic and readily identifiable label which can withstand the shock, high temperatures, pressures and reactive atmospheres encountered when said explosive material is detonated to provide identification for said explosive material, which method comprises:

a. selecting a combination comprising different inorganic

phosphor materials the most of which are inorganic phosphor materials activated by different ions which provide different and distinctive line emissions when said phosphor materials are excited by predetermined energy, with the different and distinctive emissions of said different selected phosphor materials providing indicia of sufficient different bits of then-known information regarding said explosive material to provide an identification of said explosive material; and



b. securing as an information label in intimate association with said explosive material and receptive to the shock, high temperatures, pressures and reactive atmospheres resulting from detonation thereof said selected predetermined combination of said different phosphor materials, whereby the later identification of said explosive material is determinable by said different and distinctive emissions of said selected phosphor materials.

4,013,491

INCENDIARY COMPOSITIONS OF MAGNESIUM AND FLUOROALKYL PHOSPHATE ESTERS

Graham C. Shaw, Garland, Utah, and Russell Reed, Jr., Ridgecrest, Calif., assignors to Thiokol Corporation, Newtown, Pa.

Filed May 14, 1975, Ser. No. 577,199
Int. Cl.² C06B *45/10, 39/06, 39/02, 33/00*
U.S. Cl. 149—19.3 **11 Claims**

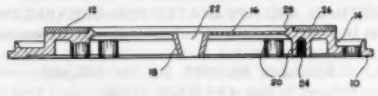
1. An incendiary composition consisting essentially of particulate magnesium and a mono- or difluoroalkyl phosphate ester or mixture of said fluoroalkyl phosphate esters wherein the alkyl group or groups are all fluoroalkyl groups and have 5 to 11 carbon atoms.

4,013,492

METHOD OF SIMULTANEOUSLY PLATING DISSIMILAR METALS

Edgar Avinell Rager, Campbell, and Barry Bruce Webber, Morgan Hill, both of Calif., assignors to Edgar Avinell Rager, Campbell, Calif.

Filed Oct. 21, 1975, Ser. No. 624,425
Int. Cl.² C25D *5/44, 5/36;* **C23C** *3/00;* **B32B** *15/20*
U.S. Cl. 156—632 **12 Claims**



1. A process for plating an article comprising the steps of

a. joining two dissimilar metals, including a first metal selected from the group consisting of ferromagnetic metals, brass metals, and copper metals with a second metal selected from the group consisting of aluminum metals and magnesium metals;

b. simultaneously chemically cleaning exposed surfaces of said joined metals and thereafter,

c. simultaneously depositing a layer of plating material on said exposed surfaces of said joined metals.

4,013,493

PROCESS FOR ETCHING GLASS OR CERAMIC SURFACE

Truman L. Ward; Ruth R. Benerito, both of New Orleans, and Jacques J. Hebert, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 499,689, Aug. 22, 1974, Pat. No. 3,926,709. This application Sept. 8, 1975, Ser. No. 611,371
Int. Cl.² C03C *15/00*
U.S. Cl. 156—654 **1 Claim**

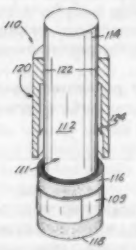
1. A process for etching a glass or ceramic surface, the process comprising placing an appropriately shaped or cut piece of sodium plumbite treated cellulosic textile containing about at least 25% lead, flat against the surface of glass or ceramic; heating the assembly in a closed heating chamber for about 60 minutes at temperatures of about from 600° to 700° C.; the chamber and contents being cooled gradually to avoid fracture of the original glass or ceramic surface; and peeling off the newly formed glasslike product to reveal an etched area that is identical to the shape and relief of the original cellulosic textile.

4,013,494

TUBE FORMING METHOD

Richard A. Patterson, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 479,671, June 17, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,719
Int. Cl.² B29C *27/18;* **B29D** *23/10*
U.S. Cl. 156—86 **6 Claims**



1. A method for forming a tube from a predetermined length of tape having a coating of pressure sensitive adhesive extending the entire predetermined length of one surface of the tape, said method including the steps of:

providing a multiplicity of resilient flexible bristles arranged with their tips projecting outwardly to define at least the major portion of a peripheral surface in the shape of a tube about an axis;

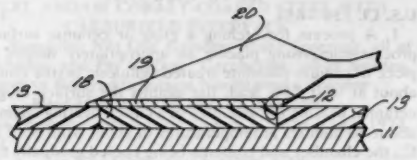
wrapping the tape around said peripheral surface with the adhesive coating contacting the bristle tips and the ends of the tape overlapped to form a tube; and

sliding the tube axially off the peripheral surface so that the flexible bristles are deflected axially of the peripheral surface thereby decreasing the cross section size of the peripheral surface defined by the bristle tips and breaking the contact between each bristle tip and the pressure sensitive adhesive on the inner surface of the tube.

4,013,495
METHOD FOR REPAIRING PIGMENTED AND TEXTURED FLEXIBLE MATERIALS

Harvey J. Golumbic, Fullerton, Calif., assignor to Vinyl-Chem International, Inc., Glendale, Calif.

Filed Sept. 17, 1975, Ser. No. 614,130
Int. Cl.² B32B 35/00
U.S. Cl. 156—98 10 Claims



1. A process for repairing damaged area in a pigmented vinyl base material comprising:

a. preparing an area to be repaired in the vinyl base material by making a hole with a sharp, clean edge;

b. cleaning the surface of the base material adjacent to the hole;

c. drying the cleaned area;

d. applying at least one layer into the hole, the layer being of a liquid vinyl-welding compound having a color contrasting with the color of the vinyl base material and having a fusion temperature about equal to that of the vinyl base material, and a high tensile strength relative to the vinyl base material;

e. applying one top layer into the hole, the top layer being of a liquid vinyl-welding compound pigmented to match the color of the vinyl base material, and having a fusion temperature about equal to that of the vinyl base material, and a high tensile strength relative to the vinyl base material;

f. working each layer before applying a successive layer around the edge of the hole to obtain intimate contact between the vinyl base material and the layers;

g. curing each layer and fusing each layer into the vinyl base material before applying a successive layer by the application of heat after each layer has been worked;

h. cooling each cured layer before applying a successive layer to prevent the premature curing of the successive layer; and

i. leveling the last pigmented layer before it is cured to obtain a continuous surface between the vinyl base material and the last layer.

4,013,496
METHOD FOR PRODUCING SHRUNKEN PILFER-PROOF NECK LABELS ON CONTAINERS

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 22, 1974, Ser. No. 526,124
Int. Cl.² B65C 3/20; B29C 27/22, 27/30; B32B 1/00
U.S. Cl. 156—85 7 Claims

1. The method of labelling containers each having a closure applied on one end thereof, comprising

providing a web of preprinted, heat shrinkable, organic thermoplastic material,

forming transverse pleats across the width of the web at spaced intervals along the length of the web,

cutting lengths of said material from the web to form label blanks, each of the blanks having plural transverse pleats thereon,

wrapping each of said blanks on a mandrel,

overlapping the leading and trailing ends of the blank on the mandrel and bonding the overlapped ends together to form a seamed sleeve, the sleeve having said pleats disposed on either side of the said seam thereof,

placing the sleeve over a container with a closure thereon, the sleeve being positioned to encircle a portion of the container adjacent the closure and the closure, and

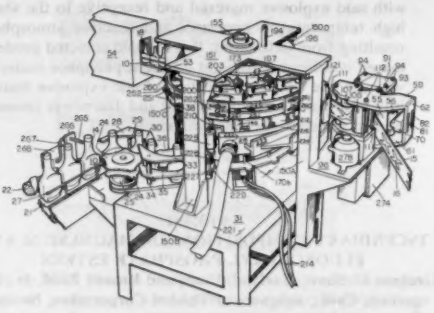
heating the label sleeve sufficiently to shrink it into snug surface engagement with said container and closure and thereby isolate any wrinkles at said pleats.

4. The method of making a pilfer-proof package comprised of the steps of:

providing a web of heat shrinkable organic thermoplastic material,

scoring the web lengthwise thereof to form a partial depth slit in the web to provide a predetermined weakened line therein that extends along the length dimension thereof and disposed laterally in the web corresponding to a predetermined height location in labels to be made therefrom,

cutting lengths of said material from the web to form label blanks,



wrapping each of said blanks on a mandrel, with said slit adjacent the mandrel and extending circumferentially of the mandrel,

overlapping the leading and trailing ends of the blanks on the mandrel and heat sealing them together to form an axially seamed label sleeve,

applying pressure to the heat sealed seam on the mandrel,

placing the label sleeve over a bottle having a skirted closure closing one end thereof, the label sleeve encircling the neck of the bottle and closure and axially positioned thereon such that the circumferential slit is located adjacent the annular terminal edge of the closure skirt, and

heating the material of the label sleeve sufficiently to shrink it into annular snug surface engagement with said bottle neck and closure providing a surface conforming, pilfer detecting label thereon.

4,013,497
METHOD AND APPARATUS FOR DELABELING

William D. Wolf, Simsbury, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed July 31, 1975, Ser. No. 600,605
Int. Cl.² B32B 31/18
U.S. Cl. 156—154 18 Claims

11. A dry process for delabeling axially symmetrical, light-weight plastic containers comprising the steps of:

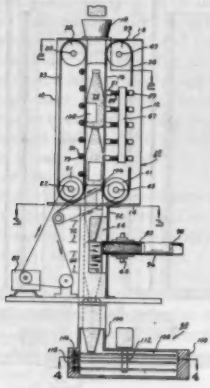
A. sequentially inserting said containers lengthwise to a tubular feed passage;

B. driving the containers in the direction of their longitudinal axes along the feed passage toward a delabeling zone;

C. rotating the containers about their axes after reaching said zone;

D. abrading labels from the containers in the delabeling zone during said rotation;

E. supporting the containers in a direction substantially perpendicular to their axes during said abrading and rotating; and



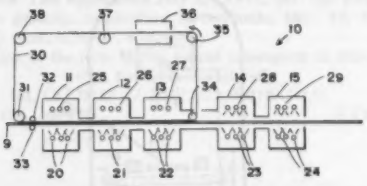
F. air conveying the removal labels from said delabeling zone as released from the containers.

4,013,498

ETCHING APPARATUS FOR ACCURATELY MAKING SMALL HOLES IN THICK MATERIALS

John J. Frantzen, North St. Paul, and Lee C. Barton, St. Anthony Village, both of Minn., assignors to Buckbee-Mears Company, St. Paul, Minn.

Division of Ser. No. 487,665, July 11, 1974, Pat. No. 3,971,682. This application Sept. 29, 1975, Ser. No. 617,682
Int. Cl.² C23F *1/02*
U.S. Cl. 156—345 **1 Claim**



1. An apparatus for making elongated etched openings in a television aperture mask whereby the etched openings have a minimum dimension which is less than the thickness of the continuous sheet of metal;

means for receiving a sheet of material of thickness T having an etchant resist pattern on opposite sides, one of the etchant resist patterns defining an opening larger than the thickness of the material and the etchant resist pattern on the opposite side defining an opening having a dimension less than the thickness of said material;

an etchant resist shield for forming a leakproof seal over the etchant resist pattern which defines openings having a dimension less than the thickness of said material; said etchant resist shield comprising a belt of flexible material operable to be peeled off said sheet of material; a pair of rollers for applying said etchant resist shield into contact with said sheet of material;

means for supporting said sheet of material and said etchant resist shield during the etching of said sheet of material;

a first set of at least three etching stations having means for spraying etchant upward onto the side of said material having etchant resist defining openings which are larger than the thickness of said material;

means for separating the etchant resist shield from the etchant resist without removing the etchant resist;

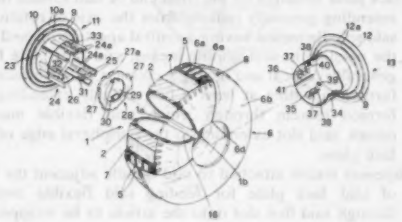
and a second set of at least two etching stations having means for simultaneously spraying etchant on the material from above and for spraying etchant on the material from below to produce an opening having a minimum dimension less than the thickness of said material.

4,013,499

APPARATUS FOR SUPPORTING A TIRE WHILST A STRIP OF PREMOLDED TREAD IS BEING APPLIED THERETO IN ORDER TO RECONSTRUCT THE TREAD ON THE SAID TIRE

Italiana Benigni, Lucca, Italy, assignor to Ital-Rubber S.r.l., S. Alessio (Lucca), Italy

Filed Oct. 15, 1975, Ser. No. 622,648
Claims priority, application Italy, Oct. 31, 1974, 3514/74
Int. Cl.² B29H *17/38*
U.S. Cl. 156—394 **8 Claims**



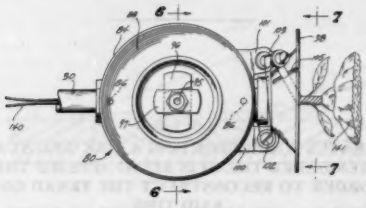
1. An improved apparatus for supporting a tire whilst a strip of premolded tread is being applied thereto in order to reconstruct the tread on the said tire, the apparatus comprising a rim which circumferentially supports the said tire, the outside surface of which, suitably prepared, has wound around it a strip of premolded tread, with special bonding means being interposed between said strip of tread and the surface of the tire facing it and including a protective casing which closely externally enshrouds the strip of tread and the side walls of tire, extending up to the vicinity of the beading on the tire, said rim being constituted by two coaxial tubular members, a first member of which is inserted axially in the second member, said first and second members having around their circumference parts that can be connected to one another in a free and complementary fashion at the time said first member is inserted in said second member, said parts having a plurality of grooves aligned in batches along planes perpendicular to the axis of said first and second member, it being possible to lock said first member to said second member and to unlock it therefrom by partially rotating in one direction or the other, a disk housed in one of the aforementioned batches of grooves, said first and second tubular members being provided externally with a rim portion extending symmetrically with respect to a plane perpendicular to the axis of the tire supporting rim wherein the surface pointing towards the inside of the said tire supporting rim is shaped to externally enshroud both the bead on the tire and part of the side walls thereof at the time said members are locked one to the other, and at least two further grooves provided on said surface and extending in a direction parallel to the plane of symmetry, said further grooves housing integrally the same number of sealing rings as there are grooves, these serving to lock the said protective casing up against the side walls of the tire in sn air tight fashion.

4,013,500

APPARATUS FOR WRAPPING ELONGATED ARTICLES

James J. Koput, 13910 Forest Knoll Court, New Berlin, Wis. 53151, and Elmer P. Knoll, c/o General Delivery, Wautoma, Wis. 54982

Filed Oct. 6, 1975, Ser. No. 619,913
Int. Cl.² B65H 81/00
U.S. Cl. 156—425 17 Claims



1. Apparatus for wrapping elongate articles with a flexible material, said apparatus comprising:

a base;

hollow spindle means rotatably mounted on said base and having an open front end for receiving articles to be wrapped;

a face plate mounted on the front end of said spindle means extending generally radially from the axis of rotation of said spindle means having a central aperture aligned with the opening in said spindle means, said face plate being generally conical and having a concave front surface and further including at least a first radially extending slot formed therein through which said flexible material passes, said slot extending to the peripheral edge of said face plate;

dispenser means attached to said spindle adjacent the back of said face plate for feeding said flexible material through said first slot onto the article to be wrapped;

roller means disposed between said dispenser means and the back of said face plate for guiding said flexible material to said slot, said slot being angularly advanced from said roller means in the direction of rotation of said spindle means; and

means for rotatably driving said spindle means.

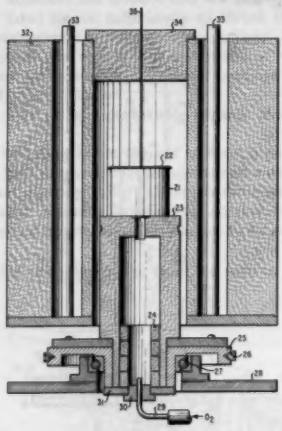
4,013,501

GROWTH OF NEODYMIUM DOPED YTTRIUM ALUMINUM GARNET CRYSTALS

Le Grand Gerard Van Uitert, Morris Township, Morris County, and George John Zydzik, Columbia, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 27, 1976, Ser. No. 690,613
Int. Cl.² B01J 17/04; C01F 17/00
U.S. Cl. 156—605 9 Claims

1. A method of growing neodymium-doped yttrium aluminum garnets from a melt of a mixture of flux components PbO, PbF_2, B_2O_3, and constituent components Nd_2O_3, Y_2O_3, and Al_2O_3 and maintained in an atmosphere containing a substantial amount of oxygen and at an initial temperature on the order of 1300° C CHARACTERIZED IN THAT said melt is (a) cooled at a first rate in the range of from 0.1° C per hour to 10° C per hour to a first temperature in the range of from 1050° C to 1200° C, (b) rapidly reheated to a temperature on the order of 1300° C, (c) cooled at a second rate in the range of from 0.1° C per hour to 3° C per hour to a second temperature in the range of from 1050° C to 1200° C, (d) maintained at said second temperature for a period of from 1–20 days, and (e) cooled at a third rate in the range of from 0.1° C per hour to 3° C per hour to a temperature in the range of from 900° C to 950° C and further CHARACTERIZED IN THAT a



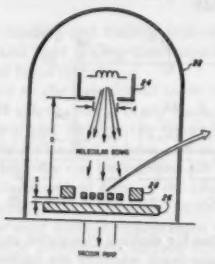
temperature gradient in the range of from 5° C/cm to 80° C/cm is maintained in said melt.

4,013,502

STENCIL PROCESS FOR HIGH RESOLUTION PATTERN REPLICATION

Edward J. Staples, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed June 18, 1973, Ser. No. 370,897
Int. Cl.² C23C 13/08
U.S. Cl. 156—608 3 Claims



3. A method for replication of a patterned thin film on a substrate comprising:

preparing a wafer of single crystalline semiconductor material so as to locate its upper and lower surfaces in planes parallel to a fast etching crystallographic plane of the single crystalline semiconductor material of said wafer,

etching the upper surface of said wafer with an orientation dependent etchant to form a recess therein bounded by vertical side walls lying in planes respectively perpendicular to the upper surface of said wafer,

forming a mask layer covering the upper surface of said wafer including the recessed area thereof,

patterning said mask layer by selectively removing portions therefrom to expose at least one portion of the bottom surface of said recess formed in said wafer while another portion of the bottom surface of said recess remains covered by the patterned mask layer,

epitaxially growing the same semiconductor material as that of said wafer on the said exposed at least one portion of the bottom surface of said recess until the level of said epitaxial growth is substantially flush with the upper surface of said wafer,

removing the patterned mask layer from said wafer,

etching the lower surface of said wafer in a region in registration with the recess formed in the upper surface of said wafer up to the depth of said recess to provide at least one patterned opening extending through said wafer in a membrane area defined by the epitaxial growth of said semiconductor material and a reduced thickness as compared to the remainder of said wafer, thereby defining a high resolution stencil having said at least one patterned opening through said membrane area, wherein the boundaries between each said opening and the membrane area of said stencil defining the periphery thereof lie substantially in planes perpendicular to the upper and lower surface of said stencil,

interposing said high resolution stencil between a molecular beam source of film-forming material and a substrate on which the patterned thin film is to be deposited wherein said high resolution stencil serves as a deposition mask, and

directing a molecular beam from the source onto the membrane area of said stencil such that the molecular beam passes through said at least one patterned opening to the portion of the substrate exposed therebeneath for depositing the patterned thin film thereon.

4,013,503

FILAMENTARY SILICON CARBIDE CRYSTALS BY VLS GROWTH IN MOLTEN IRON

Wilhelmus Franciscus Knippenberg, and Gerrit Verspui, both of Eindhoven, Netherlands, assignors to North American Philips Corporation, New York, N.Y.

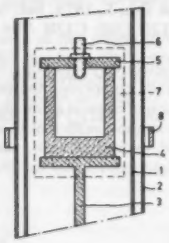
Continuation of Ser. No. 226,284, Feb. 14, 1972, abandoned, which is a continuation of Ser. No. 690,005, Dec. 12, 1967, abandoned. This application July 25, 1975, Ser. No. 599,087

Claims priority, application Netherlands, Dec. 14, 1966, 6617544; Mar. 8, 1967, 6703609

The portion of the term of this patent subsequent to Mar. 20, 1990, has been disclaimed.

Int. Cl.² B01J *17/26, 17/32;* **C01B** *31/36*

U.S. Cl. 156—609 **5 Claims**



1. A method of manufacturing filamentary crystals of silicon carbide, comprising the steps of:

applying elemental iron in finely divided form to a substrate surface capable of withstanding temperatures in the range of 1150° C to 1400° C; and

exposing said substrate surface to an atmosphere containing carbon and silicon at a temperature between 1150° C and 1400° C, until droplets comprising iron form on said surface dissolving carbon and silicon from said atmosphere and filamentary crystals of silicon carbide of desired length grow from said surface at the sites of said droplets carrying said droplets away from said surface on the ends of said crystals.

4,013,504

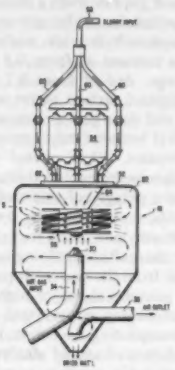
METHOD AND APPARATUS FOR SPRAY DRYING SLURRIES AND THE LIKE

Walter E. Morris, 752 Thurmond Drive, Macon, Ga. 31204

Filed Sept. 18, 1975, Ser. No. 614,643

Int. Cl.² B01D *1/16*

U.S. Cl. 159—4 **7 Claims**



1. An apparatus for spray drying a slurry or the like comprising a drying chamber, a high speed rotary atomizing head within the drying chamber including a hollow body portion and external rotary driving means coupled with the body portion to rotate the same at high speed in the drying chamber, said hollow body portion having circumferentially spaced slurry discharge orifices extending radially of the rotational axis of the body portion, slurry delivery means connected with the hollow body portion for feeding a slurry thereto from a slurry source external to the drying chamber, a plurality of radially wide and axially spaced parallel spiral vanes on the exterior of the body portion of the atomizing head, each vane comprising an interrupted spiral segment extending for a part only of the circumference of said body portion and rigid therewith and being staggered on the body portion axially relative to adjacent segments to thereby define plural drying gas inlet mouths peripherally and axially distributed around the circumference of the rotary atomizing head, and said mouths each being adjacent to one of said slurry discharge orifices and each directing the gas transversely across the associated orifice axis, and conduit means connected in said drying chamber for introducing a heated drying gas into the chamber in proximity to the rotary atomizing head and for causing cyclonic flow of the gas in the drying chamber, the drying gas entering said mouths between said vane segments and passing radially and circumferentially over the faces of the vane segments to scrub and dry slurry films as the films move radially outwardly on the vane segments, atomized slurry particles which are formed radially from the atomizing head being further dried in said chamber by passing into the cyclonic flow stream of said gas, dry solids outlet means on the drying chamber, and spent drying gas exhaust means in the drying chamber.

4,013,505

METHOD OF DEINKING PRINTED WASTEPAPERS

Cestmir Balcar, Roztoky; Antonin Kostka, Bratislava; Jaroslav Havranek, Bratislava, and Marcel Lalák, Bratislava, all of Czechoslovakia, assignors to Vyzkumny ustav papieru a celulosy, Bratislava, Czechoslovakia

Continuation-in-part of Ser. No. 233,034, March 9, 1972, abandoned, and a continuation-in-part of Ser. No. 478,286, June 11, 1974, abandoned. This application May 30, 1975, Ser. No. 582,368

Int. Cl.² D21C 5/02

U.S. Cl. 162—5 5 Claims

1. Process of deinking printed wastepapers which comprises impregnating said papers with a solution of alkali reacting compounds selected from the group consisting of sodium hydroxide, potassium hydroxide, sodium silicate and sodium carbonate in an amount of from 0.5 to 4.0% by weight of wastepaper charge, and of from 0.2 to 2.0% by weight of wastepaper charge of surface active agents characterized by having wetting and detergent power selected from the group consisting of alkyl benzene sulphonates, alkyl ether polyoxyethylene sulphonates, alkyl phenyl ether polyoxyethylene sulphonates, polyoxyethylene alkyl phenol ethers, polyoxyethylene alkyl ethers, polyglycol esters of fatty acids, alkylolamides of fatty acids, and quaternary condensation products of fatty amine with ethylene oxide for releasing the printing ink from the paper, thereafter repulping said paper to effect separation of the ink from the paper, during the repulping adding large flakes of granular shape of high-adsorptive material to the solution containing paper, said flakes being prepared separately by precipitating a solution of metal soaps of organic acids with a solution of salt of alkaline earths, together with addition of a suitable organic compound of hydrocarbon character to increase the stability of said flakes and to improve adsorption of the printing ink onto said flakes, and thereafter removing said granular flakes with adsorbed printing ink from the repulped paper stock by latent vortex action in an outer vortex in the solution in which the repulped paper is suspended.

4,013,506

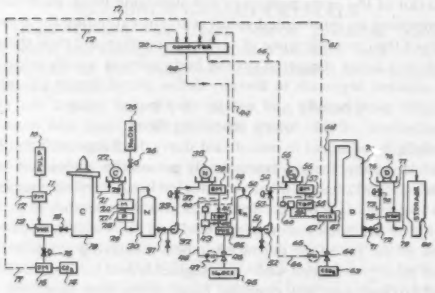
METHOD AND APPARATUS FOR AUTOMATICALLY AND SIMULTANEOUSLY CONTROLLING SOLUTION VISCOSITY AND BRIGHTNESS OF A PULP DURING MULTI-STAGE BLEACHING

John A. Histed, L'Orignal; William H. Lawford, and Murray J. McLeod, both of Hawkesbury, all of Canada, assignors to Canadian International Paper Company, Montreal, Canada

Filed July 22, 1974, Ser. No. 490,324

Int. Cl.² D21C 9/14, 9/10

U.S. Cl. 162—49 28 Claims



1. A system for automatically and simultaneously controlling at predetermined fixed values both the solution viscosity and brightness of a pulp during a multi-stage bleaching process which employs first a chlorination stage followed by a plurality of other bleaching stages, in one of which other bleaching stages a hypochlorite bleaching reagent is used and in which stage solution viscosity of said pulp is controlled, and in another subsequent bleaching stage employing a chlorine dioxide reagent final pulping brightness is controlled, comprising means for regulating the amount of addition of said hypochlorite bleaching reagent and the said chlorine dioxide reagent by means of generating two control signals which are representative of predetermined solution viscosity and brightness values, respectively, which means employs at least one optical reflectance monitoring sensor which electronically feeds reflectance values to a computer which transmits the said control signals to regulators which control the addition of said hypochlorite and chlorine dioxide bleaching reagents; one of said optical reflectance monitoring sensors monitoring the pulp subsequent to said chlorination stage and prior to said chlorine dioxide bleaching stage.

8. A process for automatically and simultaneously controlling at predetermined fixed values both the solution viscosity and brightness of a pulp bleached in a multistage bleaching process which employs a plurality of bleaching reagents, said process employs first a chlorination stage, one subsequent stage of said process employs hypochlorite bleaching reagent wherein pulp solution viscosity is controlled, in another subsequent stage subsequent to the addition of hypochlorite bleaching reagent which employs chlorine dioxide bleaching reagent final pulp brightness is controlled, in which process the amount of addition of said hypochlorite bleaching reagent and said chlorine dioxide bleaching reagent is regulated by means of two control signals which are representative of predetermined solution viscosity and brightness, respectively, said control signals being provided by at least one optical reflectance monitoring sensor which electronically feeds reflectance values to a computer which transmits the said control signals to regulators which control the addition of said hypochlorite and chlorine dioxide bleaching reagents; one of said optical reflectance monitoring sensors monitoring the pulp subsequent to said chlorination stage and prior to said chlorine dioxide bleaching stage.

4,013,507

IONENE POLYMERS FOR SELECTIVELY INHIBITING THE VITRO GROWTH OF MALIGNANT CELLS

Alan Rembaum, Altadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

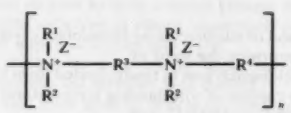
Division of Ser. No. 398,376, Sept. 18, 1973, abandoned. This application Feb. 5, 1975, Ser. No. 547,234

Int. Cl.² C12B 1/00; C12H 1/04; C12K 9/00

U.S. Cl. 195—1.8 14 Claims

1. A method of selectively inhibiting the in vitro growth of malignant animal cells comprising the steps of:

adding to a mixture of normal and malignant cells an ionene polymer in an amount sufficient to selectively inhibit the growth of said malignant cells, said polymer having a molecular weight from 3,000 to 100,000 of the formula:



where R^1 and R^2 are lower alkyl, R^3 and R^4 are divalent aliphatic, aromatic or heterocyclic groups containing at least 3 carbon atoms, or R^3 combined with R^1 and R^2 forms a cyclic group, Z^- is an anion and n is an integer; and

binding said polymer to said malignant cells.

9. A method according to claim 8 in which the surface has a net negative charge before said coating is applied.

4,013,508

PROCESS FOR THE PRODUCTION OF 1-ASPARTIC ACID BY FERMENTATION OF HYDROCARBONS

Vittorio Zangrandi, and Paolo Peri, both of Milan, Italy, assignors to Liquichimica S.p.A., Milan, Italy

Filed Nov. 13, 1975, Ser. No. 631,454
Claims priority, application Italy, Nov. 21, 1974, 54163/74
Int. Cl.² C12B 1/00
U.S. Cl. 195—28 R 7 Claims

1. Process for the production of l-aspartic acid by fermentation of hydrocarbons, characterized in that the fermentation is obtained by incubation of a hydrocarbon-containing culture medium after inoculation with microorganisms first of *Candida Hydrocarbofumarica* ATCC 20473 and subsequently Bacillus species ATCC 31177 in a cumulative exocellular metabolism whereby to produce l-aspartic acid.

4,013,509

PRODUCTION OF L(+)-TARTARIC ACID

Yoshio Kamatani, Osaka; Hisayoshi Okazaki, Kyoto; Ko Imai, Osaka; Noriaki Fujita, Osaka; Yoshio Yamazaki, Osaka, and Katsuhiko Ogino, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

Filed Jan. 19, 1976, Ser. No. 650,024
Claims priority, application Japan, Jan. 31, 1975, 50-13737; May 7, 1975, 50-54957
Int. Cl.² C12D 1/02
U.S. Cl. 195—30 7 Claims

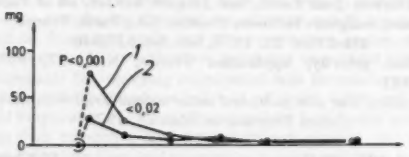
1. In a method for the preparation of tartaric acid by microbiologically hydrolyzing epoxysuccinic acid, an improved method for producing L(+)-tartaric acid, which comprises; (1) incorporating calcium cis-epoxysuccinate as a raw material in a culture medium; (2) incubating a microorganism which is capable of hydrolyzing cis-epoxysuccinic acid to L(+)-tartaric acid; and (3) thereby converting the calcium cis-epoxysuccinate into calcium L(+)-tartarate.

4,013,510

GLYCOSIDE-HYDROLASE ENZYME INHIBITORS

Werner Frommer; Walter Puls, both of Wuppertal-Elberfeld; Dietmar Schafer, Neuhof near Fulda, and Delf Schmidt, Wuppertal-Vohwinkel, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 213,066, Dec. 28, 1971, Pat. No. 3,876,766. This application July 31, 1974, Ser. No. 493,463
Claims priority, application Germany, Dec. 28, 1970, 2064092
The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C12B 13/00
U.S. Cl. 195—31 R 1 Claim



1. A method of inhibiting the reaction of carbohydrates and carbohydrate-splitting enzymes of the digestive tract which comprises conducting the reaction of said carbohydrates and carbohydrate-splitting enzymes of the digestive tract in the presence of an enzyme inhibitor for said carbohydrate-splitting enzymes of the digestive tract derived from a strain of microorganism of the order Actinomycetales, wherein said enzyme inhibitor:

a. is substantially heat-stable at neutral pH values;
b. is stable to acid at pH 2;
c. is stable to alkali at pH 12;
d. is slowly dialyzable;
e. is not inactivated by trypsin or pepsin;
f. does not inhibit trypsin or pepsin;
g. is not receptive to protein dyes;
h. is free from characteristic UV absorption up to 250 nm.;
i. is not inhibited by urea or β-mercaptoethanol;
j. is of molecular weight 500–6000; and
k. yields a monosaccharide on hydrolytic splitting.

4,013,511

IMMOBILIZED ENZYMES

Leon Goldstein; Ephraim Katzir (Katchalski), both of Rehovot; Yehuda Levin, Tel-Aviv, and Shmaryahu Blumberg, Rishon Lezion, all of Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed May 10, 1974, Ser. No. 469,043
Claims priority, application Israel, May 13, 1973, 42254
Int. Cl.² C07G 7/02
U.S. Cl. 195—63 1 Claim

1. An enzymatically active substance, comprising:

a polymeric hydrophilic carrier, selected from the group consisting of EMA-p,p'-diaminodiphenyl methane and EMA-hydrazide made cationic by reaction with N,N-dimethyl-1,3-propane diamine, said EMA-P,P'-diaminodiphenyl methane and EMA - hydrazide being the reaction product of ethylene-maleic anhydride copolymer (EMA) having pendent anhydride groups and an amount sufficient to provide an essentially complete reaction with the EMA pendent anhydride groups of diamine selected from the group consisting of hydrazine and p,p'-diaminodiphenylmethane whereby reaction between the diamine and the pendent anhydride groups of the EMA provides said polymeric carrier with pendent amine groups, and

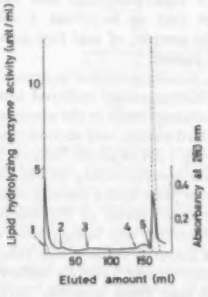
said cationic carrier having an enzyme covalently bound thereto.

4,013,512

METHOD FOR ADSORPTION AND ELUTION OF LIPID HYDROLYZING ENZYMES

Yoshitsugu Kosugi; Hideo Suzuki, and Akira Kamibayashi, all of Chiba, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Sept. 18, 1974, Ser. No. 507,050
Claims priority, application Japan, Nov. 19, 1973, 48-129919
Int. Cl.² C07G 7/02
U.S. Cl. 195—66 R 11 Claims



1. A method for separating a lipid hydrolyzing enzyme whose molecules have outwardly exposed hydrophobic residues from a solution containing said enzyme, which comprises:

1. bringing said crude lipid hydrolyzing enzyme solution

into contact with an insoluble carrier having a hydrophobic organic compound directly or through a spacer attached thereto forming a hydrophobic residue for thereby causing the lipid hydrolyzing enzyme contained in said crude lipid hydrolyzing enzyme solution to be adsorbed by the hydrophobic residue onto said insoluble carrier, said hydrophobic residue being a hydrophobic residue of the organic compound, the organic compound being an aromatic, alicyclic or heterocyclic compound, and

2. exposing the lipid hydrolyzing enzyme adsorbed on said hydrophobic residue to contact with one member selected from the group consisting of a liquid containing a surface active agent, a liquid containing a protein denaturing agent and an organic solvent miscible with water for thereby eluting the lipid hydrolyzing enzyme into the liquid.

4,013,513

ION EXCHANGE CHROMATOGRAPHIC ISOENZYME SEPARATION AND ISOLATION

William H. Lederer, Pittsburgh, Pa., assignor to E-C Apparatus Corporation, St. Petersburg, Fla.

Filed Jan. 30, 1976, Ser. No. 654,142

Int. Cl.² C07G 7/026; C12K 1/00

U.S. Cl. 195—66 R **22 Claims**

1. A process of separating and isolating fractions containing isoenzymes from a sample of tissue extract or blood serum comprising ion-exchange column chromatographically separating said sample containing said isoenzymes into a first fraction containing the hepatic isoenzyme of lactic acid dehydrogenase (LDH_5) and a second fraction containing the myocardial isoenzymes of lactic acid dehydrogenase ($LDH_{1,2}$), the myocardial isoenzyme of creatine phosphokinase (CPK-MB) and prostatic acid phophatase by ion-exchange column chromatographing said sample on a weakly-basic anion-exchange chromatographic resin and sequentially eluting and collecting said first fraction and said second fraction, said chromatographing, eluting and collecting being conducted in accordance with the following sequence:

a. passing said sample through the anion-exchange resin in a pre-swelled form in a chromatographic column and collecting a first eluate passing through the column;

b. passing a first aqueous buffered salt solution through the anion-exchange resin in the chromatographic column and collecting a second eluate with said first eluate to obtain said first fraction containing the hepatic isoenzyme of lactic acid dehydrogenase (LDH_5), said first aqueous buffered salt solution having a pH of about 7.0 to 8.5, containing a salt with an anion corresponding to the anion of the anion-exchange resin prior to passing said sample, having a concentration in terms of the anion of about 0.01 to 0.15 equivalent/liter and being passed in an amount such that up to about 3 volume equivalents, based on said sample, of said first aqueous buffered salt solution are passed;

c. sequentially passing a second aqueous buffered salt solution and a third aqueous buffered salt solution through the anion-exchange resin in the chromatographic column to obtain a third eluate, said second aqueous buffered salt solution having a pH of about 7.0 to 8.5, containing a salt with an anion corresponding to the anion of the anion-exchange resin prior to the passing of said sample, having a concentration in terms of the anion of about 0.01 to 0.15 equivalent/liter and being passed in an amount such that at least about 4 volume equivalents, based on said sample, of said second aqueous buffered salt solution are passed, and said third aqueous buffered salt solution having a pH of about 7.5 to 8.5, containing a salt with an anion corresponding to the anion of the anion-exchange resin prior to the passing of said sample, having a concentration in terms of the anion of about 0.15 to 0.25 equivalent/liter and being passed in an amount such that about 4 or less volume equivalents, based on said sample, of said third aqueous buffered salt solution are passed; and

d. passing a fourth aqueous buffered salt solution through the anion-exchange resin in the chromatographic column and collecting a fourth eluate to obtain said second fraction containing the myocardial isoenzymes of lactic acid dehydrogenase ($LDH_{1,2}$), the myocardial isoenzyme of creatine phosphokinase (CPK-MB) and prostatic acid phosphatase, said fourth aqueous buffered salt solution having a pH of about 6.5 to 7.5, containing a salt with an anion corresponding to the anion of the anion-exchange resin prior to the passing of said sample, having a concentration in terms of the anion of about 0.4 to 0.6 equivalent/liter and being passed in an amount such that about 1 to 6 volume equivalents, based on said sample, of said fourth aqueous buffered salt solution are passed.

4,013,514

PREPARING A REACTOR CONTAINING ENZYMES ATTACHED TO DIALDEHYDE CELLULOSE

Bernard S. Wildi, Kirkwood, and Lloyd E. Weeks, Creve Coeur, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 215,432, Jan. 4, 1972, abandoned. This application Jan. 2, 1974, Ser. No. 430,213

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C07G 7/02

U.S. Cl. 195—68 **8 Claims**

1. A method for producing a biologically active flow-through reactor which comprises the steps of

reacting a liquid permeable fibrous cotton with a periodic acid solution for a time sufficient to oxidize 5 to 80 percent of the glucose units in the cotton to units containing dialdehyde groups;

substantially freeing the fibrous dialdehyde cotton of excess periodic acid;

placing the fibrous dialdehyde cotton in a liquid permeable, flow-through reactor to constitute an elongated reactor core, and

passing a liquid containing an enzyme at a substantially neutral or alkaline pH through the fibrous dialdehyde cotton in the liquid permeable, flow-through reactor to react the enzyme through a primary amino group thereof not essential for biological activity directly with aldehyde groups of the cotton so as to form a carbonnitrogen double bond and thereby binding said enzyme to said core.

4,013,515

PROCESS FOR THE PREPARATION OF THE ANTIBIOTIC 20.798 R.P.

Jean Florent; Jean Lunel, and Jacques Renaut, all of Paris, France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Nov. 25, 1974, Ser. No. 527,040

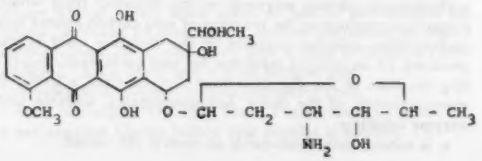
Claims priority, application France, Nov. 27, 1973, 73.42191

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

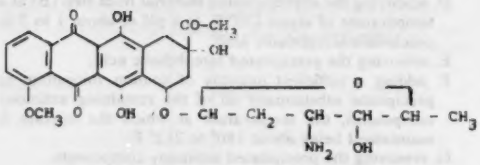
Int. Cl.² C12B 1/00

U.S. Cl. 195—80 R **15 Claims**

1. Process for the preparation of the antibiotic 20,798 RP of the formula:



or an acid addition salt thereof, which comprises the microbiological reduction of daunorubicin of the formula:



or of an acid addition salt thereof using *Streptomyces lavendulae* (ATCC 8664), *Streptomyces roseochromogenes* (ATCC 13400). *Corynebacterium simplex* (ATCC 6946) or *Bacterium cyclooxydans* (ATCC 12673), to convert the grouping $-CO-CH_2$ to $-CHOHCH_3$.

4,013,516

APPARATUS AND PROCESS FOR THE PYROLYSIS OF WASTE SOLIDS CONCENTRATES

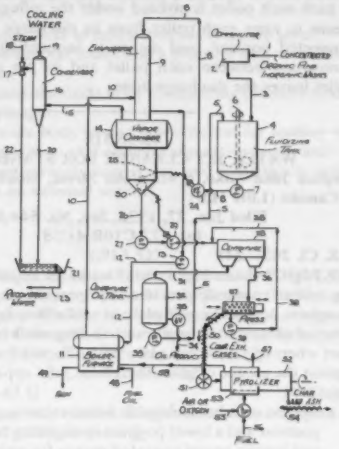
Charles Greenfield, Murray Hill; Robert E. Casparian, Boonton, and Anthony J. Bonanno, Parsippany, all of N.J., assignors to Hanover Research Corporation, East Hanover, N.J.

Filed Mar. 13, 1975, Ser. No. 558,080

Int. Cl.² C10B *43/00, 51/00;* **B01D** *3/34, 1/00*

U.S. Cl. 201—2.5 **26 Claims**

8. An apparatus system for pyrolizing initially water-containing waste solids concentrates, said system comprising (1) a tank for receiving and mixing a stream of waste solids concentrate and a stream of oil, (2) an evaporator operable by heat, (3) a conduit extending from said tank to said evaporator for transferring the mixture of waste solids concentrate and oil from said tank into the evaporating region of said evaporator, (4) a combustion apparatus associated with said evaporator for supplying evaporative heat thereto to produce a substantially anhydrous mixture of waste solids and oil in said evaporator, (5) means for separating liquid-solid mixtures into their respective liquid and solid components, (6) a conduit extending from said evaporator to said separating apparatus for transferring the substantially anhydrous mixture of waste solids and oil from said evaporator to said separating apparatus in which said anhydrous mixture may be separated into substantially all waste solids and oil, (7) a first pyrolizing means, (8) means for transferring separated waste solids from said separating apparatus to said first pyrolizing means, said pyrolizing means being disposed to receive said waste solids and substantially vaporize all the fluidizing oil remaining on the solids, (9) a second pyrolizing means, and (10) means for transferring the solid residue from said first pyrolizing means to said second pyrolizing means, said second pyrolizing means being disposed to vaporize any remaining oil present on the



solids and to destructively distill the oil-free organic solids into organic vapors and gases and a residue of char and ash.

4,013,517

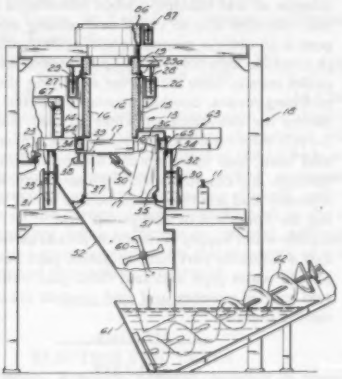
CIRCULAR TRAVELING GRATE SINTERING MACHINE

Thomas E. Ban, South Euclid; Roger L. Hulette, Berea, and Subir K. Mittra, Euclid, all of Ohio, assignors to McDowell-Wellman Engineering Company, Cleveland, Ohio

Filed Sept. 29, 1975, Ser. No. 617,849

Int. Cl.² C10B *33/00;* **B65G** *49/00;* **F27D** *1/12*

U.S. Cl. 202—262 **11 Claims**



1. A circular traveling grate machine comprising a circular trackway, annular burden confining means mounted for movement along said trackway, said burden confining means having spaced inner and outer vertical walls and a plurality of gas permeable pallets pivotally mounted with respect to a horizontal plane to one of said walls and releasably connected by pin means to the other of said walls, means for moving said burden confining means and said plurality of pallets along said trackway, stationary gas confining hood means disposed over said inner and outer walls, stationary gas confining windbox means disposed under said inner and outer walls, sealing means between the inner and outer walls and the hood and windbox means, a discharge station defined by a portion of said inner and outer walls, said hood means and a spent burden receiving chute, means to sequentially release the pin

means as each pallet enters the discharge station, means to guide each released pallet downwardly to a discharge position as each such pallet is pivoted under the influence of gravity, means to raise each pallet from its discharge position to its connected position, and means to sequentially perform the connection between each pallet and its pin means as each pallet leaves the discharge zone.

4,013,518
WATER JET CLEANER FOR STANDPIPES

Stephen John Miko, 6 Manitoba Street, Stouffville, Ontario, Canada (L0H 1L0)

Filed Jan. 27, 1975, Ser. No. 544,632
Int. Cl.² C10B *43/08*
U.S. Cl. 202—241 **4 Claims**

1. High pressure high volume water jet apparatus for cleaning coke oven standpipes, said standpipes having an elbow and an access port and cover plate at said elbow for access to the interior of said standpipe, and sealing surfaces around said port whereby said cover plate may effectively close the same against the escape of gases therefrom, said apparatus comprising;

a support member swingable between an upper inoperative position and a lower position in alignment with a said port and having power operated means for swinging the same downwardly and upwardly;

a carrier member slideably mounted on said support member and slideably in a telescopic manner relative thereto into and out of a said port, and having power operated means for moving the same;

a high pressure water pipe rotatably mounted on said carrier member with an end extending therefrom and power operated means for at least partially rotating the same;

at least two jet nozzle means at said end of said water pipe for directing jets of water along axes at a substantial angle to the axis of said water pipe and on opposite sides thereof simultaneously whereby to establish high pressure high volume jets in a divergent manner for striking the interior of said standpipe when introduced into said port and whereby also to clean said sealing surfaces of said port in an oblique manner when located outside said port;

high pressure high volume pumping means having inlet and outlet means, tank means for supplying the inlet of said pumping means, conduit means connected to said outlet means for delivering of water to said water pipe, and recycle duct means for recycling water from said outlet to said tank, and valve means for controlling flow either through said conduit or through said recycle duct means, whereby said jets may be turned on or off without affecting the operation of said pump, and,

rotatable water supply connection means having a fixed part and a rotatable part, said rotatable part being connected to said water pipe and said fixed part being fastened to said carrier member and said conduit means being connected thereto.

4,013,519
RECOVERY METHOD FOR POLYESTER STILL BOTTOMS

Bruce Noel Hoppert, and Alfred Berghausen, III, both of Cincinnati, Ohio, assignors to Safetech, Inc., Cincinnati, Ohio

Filed Mar. 25, 1976, Ser. No. 670,123
Int. Cl.² B01D *21/01*; C07C *29/26*
U.S. Cl. 203—33 **5 Claims**

1. A recovery method for polyester still bottoms which includes polyester materials, antimony compounds, terephthalic acid, and glycols, comprising:

A. subjecting the still bottoms to an alkaline hydrolysis step, the amount of water in step (A) being about 10 parts by weight of water for each part of terephthalic acid present, said alkali hydrolysis step carried out at a temperature of about 185° to 212° F. and at a pH of between about 8 to 8.5,

B. acidifying the material from step (A) to a pH of about 6.2 to 6.5 to precipitate a portion of the antimony compounds therefrom,

C. removing the precipitated antimony compounds and treating the unprecipitated material with activated carbon,

D. acidifying the unprecipitated material from step (B) at a temperature of about 170° F. to a pH of about 1 to 3 to precipitate terephthalic acid,

E. removing the precipitated terephthalic acid,

F. adding a sufficient quantity of sodium thiosulfate to precipitate substantially all of the remaining antimony compounds, the temperature at which the mixture is maintained being about 180° to 212° F.,

G. removing the precipitated antimony compounds.

5. The recovery method of claim 4 wherein the glycol recovery method comprises the steps of

H. removing about one-half of the water after step (G) at a temperature of about 180° to 212° F.,

I. adjusting the solution remaining after step (H) to a pH of about 6.5 to 8 and treating it with activated carbon,

J. adding about two parts by weight per part of alcohol to the solution remaining after step (I) to precipitate sodium sulfate and removing the sodium sulfate so precipitated,

K. evaporating a portion of the alcohol, and

L. separating glycol from the solution of step (K) by distillation.

4,013,520
PROCESS FOR SEPARATING 2,6-XYLENOL FROM A MIXTURE OF CRESYLIC ACIDS

Robert W. Maxwell, Jr., 607 Horizon View Drive, Pittsburgh, Pa. 15235

Filed May 22, 1975, Ser. No. 580,056
Int. Cl.² C07C *37/22*; B01D *3/14*
U.S. Cl. 203—34 **5 Claims**

1. A process for purifying 2,6-xylenol from a mixture containing cresylic acids wherein 2,6-xylenol is present as a major component in the mixture and the cresylic acids other than 2,6-xylenol are present as impurities, comprising:

contacting the mixture containing 2,6-xylenol and cresylic acid impurities with an ester-forming phosphorus compound in an amount in the range of 0.5 to 5.0 equivalents per equivalent of cresylic acids other than 2,6-xylenol and at a temperature in the range of 50°–250° C to produce a second mixture containing aryl phosphate esters, formed primarily from the cresylic acids other than 2,6-xylenol, and unreacted 2,6-xylenol; and distilling the unreacted 2,6-xylenol from the aryl phosphate esters and in the second mixture.

4,013,521
PROCESS FOR PURIFYING METHANOL BY DISTILLATION

Roger Hardiman Scott, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

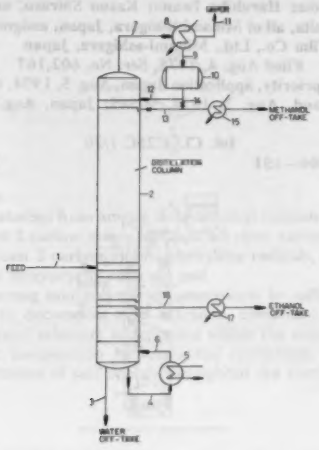
Continuation of Ser. No. 389,545, Aug. 20, 1973, abandoned. This application Jan. 29, 1975, Ser. No. 545,343
Claims priority, application United Kingdom, Aug. 15, 1973, 39949/73
Int. Cl.² B01D *3/40*
U.S. Cl. 203—85 **5 Claims**

1. A process for purifying methanol from a starting mixture of synthetic crude methanol consisting essentially of methanol, 8 to 30% by weight water and up to 0.5% by weight ethanol comprising: into

a. feeding said starting mixture to a distillation column at a level which when said column is in equilibrium operation, the water content within said column at said level is lower than in said mixture producing over a region of the column below the feed level a substantially constant methanol to water weight ratio,

b. withdrawing water as bottoms,

c. withdrawing product methanol from the upper part of the column, and



d. withdrawing a side stream enriched in ethanol from a level below the end of the region remote from the feed level.

4,013,522

METHOD AND APPARATUS FOR MEASURING THE CONCENTRATION OF CARBON MONOXIDE

Herbert Nischik, Erlangen, and Ferdinand von Sturm, Erlangen-Buchenbach, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 20, 1975, Ser. No. 542,549

Claims priority, application Germany, Jan. 23, 1974, 2403164; Nov. 15, 1974, 2454285

Int. Cl.² G01N *27/30, 27/46*

U.S. Cl. 204—1 T **17 Claims**

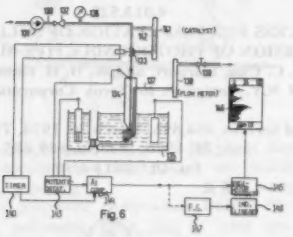


Fig. 6

1. A method for determining the concentration of carbon monoxide in a measuring gas comprising the steps of:

a. establishing an electrochemical reaction of the type causing current to flow using a electrolyte and a pair of electrodes, at least one of said electrodes being of a material whose activity is inhibited by carbon monoxide;

b. feeding the measuring gas directly to said one of said electrodes; and

c. determining the degree of inhibition of said electrochemical reaction which is caused by the carbon monoxide in said measuring gas.

17. A measuring electrode for use in measuring carbon monoxide concentrations in a measuring gas comprising:

a. an electrode body having a recess therein;

b. a pressure plunger in the bottom of said recess;

c. at least one contact making and gas distribution screen next to said plunger;

d. a catalytically active layer for effecting an electrochemical reaction of the type causing a current to flow next to said screen;

e. a cover layer next to said catalytically active layer;

f. at least one support frame and a pressure ring next to said cover layer;

g. means in said electrode body for applying pressure to said pressure plunger;

h. said electrode body having holes therein for feeding and discharging gas to said catalytically active layer; and

i. means for electrically connecting said catalytically active layer with an external contact.

4,013,523

TIN-GOLD ELECTROPLATING BATH AND PROCESS

Peter Stevens, Parsippany; John Martin Deuber, Nutley, and Kathleen Regina Rosikiewicz, Landing, all of N.J., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Dec. 24, 1975, Ser. No. 644,236

Int. Cl.² C25D *3/62*

U.S. Cl. 204—43 G **10 Claims**

1. An aqueous bath suitable for the electrodeposition of an alloy of tin and gold, comprising

gold as the auricyanide	1–30 g/l gold equiv.
tin as a stannic halide complex	1–150 g/l tin equiv.

wherein the halide is selected from the group consisting of fluoride, chloride and bromide, the bath exhibiting a pH value not in excess of 3.

4,013,524

ELECTROLYTIC CARBOXYLATION AND DIMERIZATION OF OLEFINS

Donald Armon Tyssee, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 21, 1972, Ser. No. 317,345

Int. Cl.² C25B *3/00, 3/10*

U.S. Cl. 204—59 R **14 Claims**

1. The method of electrolytic carboxylation and dimerization of alpha, beta-olefinic nitriles, esters and amides which comprises effecting electrolytic reduction at the cathode in an electrolysis medium comprising such olefinic compound, solvent, supporting electrolyte and carbon dioxide, with the concentration of the carbon dioxide with respect to the olefinic compound not being sufficient to prevent substantial dimerization, and causing production and recovery of a carboxylated dimer of the olefinic compound.

4,013,525

ELECTROLYTIC CELLS

Alan Brian Emsley, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Sept. 19, 1974, Ser. No. 507,603

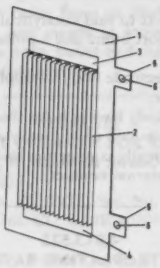
Claims priority, application United Kingdom, Sept. 24, 1973, 44682/73; July 4, 1974, 29683/74

Int. Cl.² C25C *1/26, 11/02, 11/03*

U.S. Cl. 204—98 **30 Claims**

1. An electrolytic cell comprising an anode, a cathode and a diaphragm separating the anode and the cathode wherein the anode presents to the cathode a plurality of spaced-apart parallel elongated members disposed in vertical planes so as to form a plurality of vertical channels, said members being constructed of a film-forming metal and carrying on at least part of their surfaces an electrocatalytically active coating and wherein said elongated members are rigidly mounted in the cell so that a substantial portion of said active surfaces is 6 millimeters or less from the cathode.

29. A method of manufacturing chlorine by electrolysing an



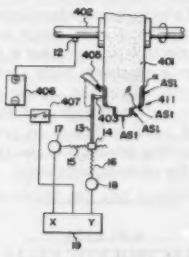
aqueous alkali metal chloride solution in an electrolytic cell as claimed in claim 1.

4,013,526

ELECTROCHEMICAL GRINDING WITH A CONDUCTIVITY-CONTROLLED WHEEL ELECTRODE

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japan Research Inc., Yokohama, Japan

Filed Apr. 14, 1975, Ser. No. 567,527
Int. Cl.² B23P 1/00
U.S. Cl. 204—129.46 12 Claims



1. A method of electrochemically grinding a workpiece by a rotating electrically conductive, abrasive wheel electrode with a machining surface constituted by an electrically conductive matrix and a layer of electrically nonconductive abrasive protrusions projecting therefrom, said method comprising the steps of:

a. preparing said wheel electrode with the machining surface of a contour corresponding to a shape to be imparted to said workpiece,

b. treating said machining surface by electrochemically solubilizing said conductive matrix at said machining surface so as to impart thereto a conductivity which locally varies as a function of the shape of said machining surface, and

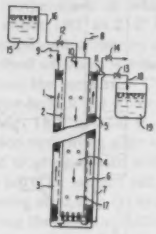
c. electrochemically grinding said workpiece with said treated machining surface.

4,013,527

ELECTROLYTIC OXIDATION OF BLIX SOLUTION

Yoshio Idota; Haruhiko Iwano; Kazuo Shirasu, and Sachio Matsushita, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 4, 1975, Ser. No. 602,167
Claims priority, application Japan, Aug. 5, 1974, 49-89604; New Zealand, Aug. 7, 1974, 90545; Japan, Aug. 8, 1974, 49-91033
Int. Cl.² C25C 1/20
U.S. Cl. 204—151 14 Claims



1. A process for electrolyzing a used blix solution obtained in processing color photographic materials, said blix solution originally containing an iron (III) chelated bleaching agent and a silver halide solvent, comprising,

providing an electrolytic cell having a cathode compartment and an anode compartment having a liquid flow path therebetween and separated by a porous membrane;

feeding into said cathode compartment at a flow rate of 3 liters/hour or more said blix solution;

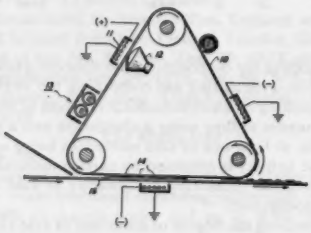
applying to the cathode of said electrolytic cell a potential of from about −0.20 to about −0.7 volts and to the anode a potential of about −0.10 to 0.50 volts while passing said blix solution from the cathode compartment to the anode compartment and controlling the cathode potential, anode potential and the current densities of said anode and cathode so as not to decompose the silver halide solvent.

4,013,528

PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

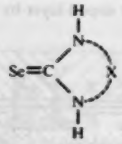
Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,445
Int. Cl.² B01J 1/10
U.S. Cl. 204—158 R 1 Claim



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a polymeric composition from a film forming insulating polymeric resin and at least one organoselenium compound of the formula



wherein

X is selected from among divalent alkyl radicals having at least 2 carbon atoms, divalent alkylene radicals having at least 2 carbon atoms, phenylene radicals, and divalent heterocyclic radicals; and

b. subjecting said polymeric composition to sufficient energy to decompose said selenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

4,013,529

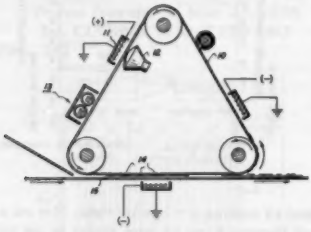
PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,303

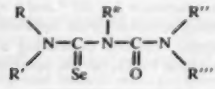
Int. Cl.² B01J *1/10*

U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix comprising:

a. forming a polymeric composition from a film forming insulating polymeric resin and at least one organoselenium compound of the formula



wherein

R, R′, R″, R‴ and R^{iv} are independently selected from hydrogen, alkyl of 1 – 10 carbon atoms, phenyl, substituted phenyl, benzyl and substituted benzyl; and

b. subjecting said polymeric composition to sufficient energy to decompose said selenium compound whereby elemental selenium is deposited within the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

4,013,530

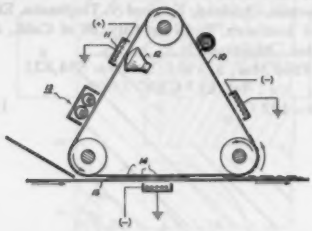
PROCESS FOR PREPARATION OF SOLID PHASE DISPERSION OF PHOTOCONDUCTIVE MATERIALS

Joseph Y. C. Chu, Fairport, and W. H. H. Gunther, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 454,896, March 26, 1974. This application Jan. 15, 1976, Ser. No. 649,437

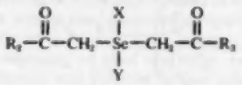
Int. Cl.² B01J *1/10*

U.S. Cl. 204—158 R **1 Claim**



1. A process for preparation of a solid phase dispersion of inorganic photoconductive materials in an insulating polymeric matrix, said process comprising:

a. forming a polymeric composition from a film forming insulating polymer resin and at least one organoselenium compound of the formula



wherein

R_2 and R_3 are independently selected from the group consisting of aroyl or substituted aroyl radicals; and

x and y are independently selected from the group consisting of halogen, oxygen, alkanoyloxy or aroyloxy.

b. subjecting said polymeric composition to sufficient energy to decompose said selenium compound whereby elemental selenium is deposited in the organic polymeric composition in substantial conformity with the distribution of said energy throughout the composition.

4,013,531

METHOD OF PRODUCING HIGH MOLECULAR FILM CONTAINING IONIZED MATERIAL

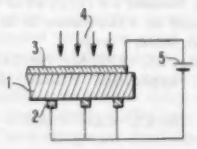
Kenichi Nakamura, and Haruko Kakutani, both of Tokyo, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Claims priority application Japan, Mar. 26, 1975, 50-35306

Filed Mar. 24, 1976, Ser. No. 669,941

Int. Cl.² C25D *1/18, 13/06*

U.S. Cl. 204—180 R **29 Claims**



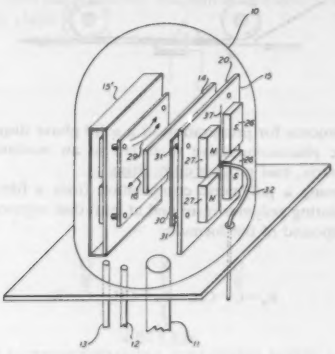
1. A method of forming in a high molecular film a non-uniform distribution of the volume concentration of ions of an ion dissassociative substance comprising the steps of, preparing said high molecular film with a substantially uniform distribution of volume concentration of ions therein, heating said

film to a temperature which is lower than the melting point of said film and simultaneously applying an electric field across said layer in amounts and for a time sufficient to cause ion movement in said film away from regions receiving the combined heat and electric field, at least one of said heat and electric field being applied in a surface pattern corresponding to the desired non-uniform distribution pattern.

4,013,532
METHOD FOR COATING A SUBSTRATE

Robert L. Cormia, Oakland; Kazumi N. Tsujimoto, El Cerrito, and Sigurd Andresen, Redwood City, all of Calif., assignors to Airco, Inc., Montvale, N.J.

Filed Mar. 3, 1975, Ser. No. 554,823
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 C **13 Claims**



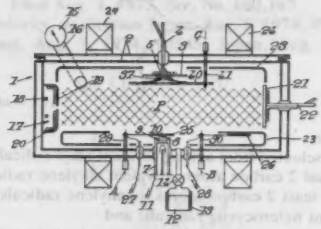
1. A method of coating a substrate with a layer of a polymeric material, which comprises:
- placing the substrate, a first electrode and a second electrode in a chamber which can be evacuated:
- introducing into the chamber a gaseous polymerizable substance;
- establishing a glow discharge in the chamber to deposit material comprising said polymerizable substance on the first electrode and the substrate;
- confining the glow discharge to a region adjacent to the first electrode; and
- applying an electric potential across the first and second electrodes so that material deposited on the first electrode is sputtered and redeposited on the substrate where a polymerized coating forms.

4,013,533
VOLATILIZATION AND DEPOSITION OF A SEMI-CONDUCTOR SUBSTANCE AND A METALLIC DOPING IMPURITY

Gerard Cohen-Solal, Chatenay; Alain Zozime, Saint-Denis, and Claude Sella, Meudon La Foret, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Mar. 25, 1975, Ser. No. 561,946
Claims priority, application France, Mar. 27, 1974, 74.10601
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 S **3 Claims**

1. A process for making a semi-conductor device having a p-n or n-p junction by a method comprising the steps of forming a first doped layer by sputter depositing on a substrate in a vacuum enclosure containing a lowpressure ionic plasma, a semi-conductor substance of an alloy $Cd_x Hg_{1-x} Te$ where x is a number between 0 and 1, volatilized from a source or target first comprising $Cd_x Hg_{1-x} Te$ in the enclosure, and co-sputter depositing an n-type metallic doping impurity from the group consisting of aluminum, indium and gallium, volatilized from a second source or target in the enclosure; and forming a second doped layer on said first doped layer by co-sputter depositing

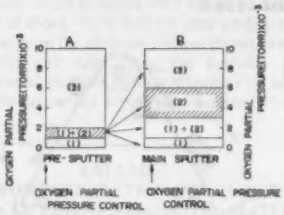


$Cd_x Hg_{1-x} Te$, volatilized from said first source, and a p-type metallic doping impurity from the group consisting of gold, copper and silver, volatilized from a third source or target in the enclosure.

4,013,534
METHOD OF MAKING A MAGNETIC OXIDE FILM

Yoshikazu Ishii, Mito; Seizi Hattori, Tomobe, and Nobuo Inagaki, Katsuta, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 14, 1975, Ser. No. 621,857
Claims priority, application Japan, Nov. 12, 1974, 49-130208
Int. Cl.² C23C *15/00*; G11B *5/82*
U.S. Cl. 204—192 M **3 Claims**



1. A method of making a magnetic oxide film on a substrate by sputtering thereto from an iron target in an atmosphere composed of a mixed gas containing an inert gas and oxygen, with the partial pressure of the oxygen being regulated, said method comprising the steps of:
- pre-sputtering the iron target in the oxygen-argon atmosphere while maintaining the oxygen partial pressure between 1×10^{-3} and 2×10^{-3} Torr, with a shutter being disposed between the iron target and the substrate; and
- sputtering from the iron target to the substrate in the oxygen-argon atmosphere while maintaining the oxygen partial pressure between 3×10^{-3} and 6×10^{-3} Torr, with the shutter being removed from between the iron target and the substrate, thereby depositing a magnetite thin film of single-phase Fe_3O_4 on the substrate.

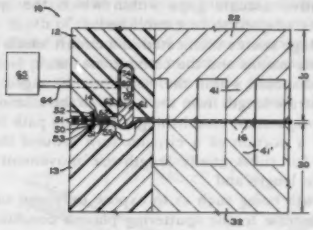
4,013,535
ELECTROLYTE SEPARATOR TENSIONING DEVICE

Donald Elias White, Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed June 7, 1976, Ser. No. 693,373
Int. Cl.² C25B *1/34, 13/00, 13/02*; B01D *13/02*
U.S. Cl. 204—252 **8 Claims**

1. An electrolytic cell having an electrolyte separator and a separator tensioning device, said tensioning device comprising

a chamber for containing a pressurized fluid, said chamber having a movable boundary portion, said movable boundary portion having an inward surface adapted to be disposed



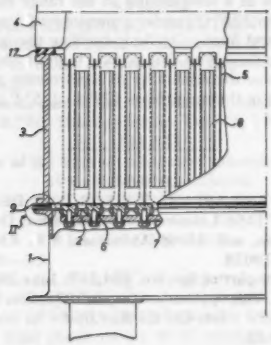
adjacent said pressurized fluid and an outward surface adjacent said separator, wherein movement of said movable boundary portion affects the tension of said separator.

4,013,536

ELECTROLYTIC CELL

Emile Cabaraux, Brussels, Belgium, assignor to Solvay & Cie, Belgium

Filed Jan. 20, 1975, Ser. No. 542,258
Claims priority, application Belgium, Feb. 6, 1974, 140615
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² B01K *3/10*; **C22D** *1/02*
U.S. Cl. 204—252 **10 Claims**



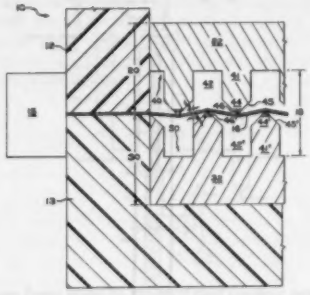
1. A cell for the electrolysis of an aqueous solution of alkali metal halide, comprising, a bottom wall, an alternating sequence of substantially vertical and parallel anodes and cathodes supported by said bottom wall, peripheral sidewalls supported on the said base wall enclosing said cathodes and anodes, a sealing joint on which said peripheral sidewalls wall rests, the sealing joint comprising a framework which surrounds the anodes and cathodes made of flat, rigid bars, an envelope in which said framework is inserted and made of a material which is resistant to corrosion and has a hardness of the Shore A Scale between substantially 2 and 20, said envelope covering at least that part of the bars of the framework that face towards the interior of the cell and disposed between the framework and said peripheral sidewalls and bottom wall.

4,013,537

ELECTROLYTIC CELL DESIGN

Donald Elias White, Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed June 7, 1976, Ser. No. 693,634
Int. Cl.² C25B *1/16, 1/26, 11/02, 13/02*
U.S. Cl. 204—256 **5 Claims**



1. In an electrolytic cell comprising:
a. an anolyte compartment and a catholyte compartment;
b. an electrolyte separator extending between said anolyte and catholyte compartments;
c. an anode within said anolyte compartment having a surface adjacent said electrolyte separator, said anode surface comprising at least one ridge and at least one groove;
d. a cathode within said catholyte compartment having a surface adjacent said electrolyte separator, said cathode surface comprising at least one ridge and at least one groove, wherein said cathode surface substantially faces said anode surface and said at least one ridge of said cathode surface is opposite said at least one groove of said anode surface,

the improvement wherein said at least one ridge of said cathode surface extends at least partially into said at least one groove of said anode surface, whereby a portion of said electrolyte separator is retained within said groove of said anode surface.

4,013,538

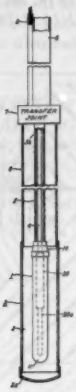
DEEP SUBMERSIBLE POWER ELECTRODE ASSEMBLY FOR GROUND CONDUCTION OF ELECTRICITY

Harold N. Schneider, Springfield; Charles H. Titus, Newtown Square, and J. Kenneth Wittle, Berwyn, all of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Dec. 22, 1971, Ser. No. 211,010
Int. Cl.² C25B *11/00*; **E21B** *43/00*
U.S. Cl. 204—280 **20 Claims**

1. In a deep submersible power electrode assembly for direct underground installation exposed to a surrounding mixture of saline and oleaginous fluids under a hydrostatic pressure head of the order of at least several hundred feet, the combination comprising an imperforate elongate electrode body having a current conducting terminal and an exposed outer surface adapted to be traversed by current flowing between said body and said fluid mixture, a permeable tubular enclosure of insulating material loosely surrounding said electrode body and defining an annular space therebetween, said enclosure having permeability sufficiently small significantly to inhibit flow of said oleaginous fluid toward said electrode body but large enough to permit limited egress of saline water from said enclosure, and means including a supply conduit for introducing saline water into said annular space at one end of said enclosure and maintaining said water under pressure greater than said hydrostatic pressure of the fluid mixture outside said enclosure, whereby the limited egress of saline water through said permeable enclosure constrains said saline

water to fill substantially the full length of said annular space thereby to cool the outer surface of said electrode body and to



conduct current at minimum surface density from said outer surface to said surrounding fluid mixture.

4,013,539

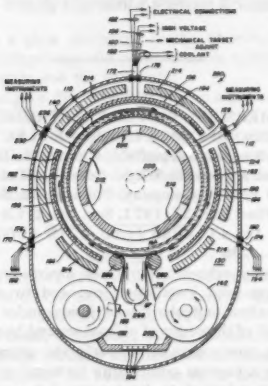
THIN FILM DEPOSITION APPARATUS

Manfred R. Kuehnle, Lexington, Mass., assignor to Coulter Information Systems, Inc., Bedford, Mass.

Division of Ser. No. 323,133, Jan. 12, 1973, Pat. No. 3,884,787. This application Nov. 1, 1974, Ser. No. 519,781

Int. Cl.² C23C *15/00*

U.S. Cl. 204—298 **36 Claims**



1. Apparatus for depositing a thin film on a length of substrate which comprises:

supply means carrying a supply of substrate to be coated,

take-up means for accumulating coated substrate length,

a pressure vessel having means therein for establishing a sputtering plasma condition within the vessel,

anode means mounted in the vessel,

cathode means comprising a plurality of targets secured on the interior of the vessel, each target having a surface formed of the material to be sputtered, the surface facing the exterior surface of the anode means but spaced therefrom, the said targets being circumferentially spaced with the said planar surfaces thereof defining at least part of a cylindrical surface that is coaxial with but larger in diameter than the anode means whereby to form a plurality of consecutive arcuate gaps within which the sputtering plasma is adapted to be established,

a high voltage source connected in a circuit which includes the anode means and the cathode means,

structure disposed within the vessel and arranged to guide the substrate length from the supply to the take-up means in a configuration establishing a tortuous path including at least a portion of a circular turn around the anode means, for substantially lengthwise movement of said substrate length and

the said path being such as to expose only one surface of said substrate to the sputtering plasma condition while said substrate is in said tortuous path.

4,013,540

PETROLEUM PITCH PREPARATION

Maurice Moyle, Oakville; Buenanventura B. Galvez, Islington; Eric C. Pease, Campbellville, and Alan Logan, Oakville, all of Canada, assignors to Gulf Oil Canada Limited, Toronto, Canada

Filed Mar. 10, 1975, Ser. No. 556,831

Int. Cl.² C10C *3/04*

U.S. Cl. 208—4 **7 Claims**

1. A process for the preparation of a petroleum pitch binder for the manufacture of carbon electrodes, comprising (1) subjecting a full range decant oil petroleum fraction, obtained as the clarified bottoms fraction of a catalytic gas oil cracking operation and having a boiling range at atmospheric pressure at least 95% of which is above 450° F (232° C), to oxy-activated condensation by heating at a temperature in the range from 400° to 500° F (204° to 260° C) under a pressure in the range from atmospheric to four atmospheres and with the addition of air introduced to the fraction for a period of from one to 24 hours until the softening point of the material has risen to a value in the range from 120° to 180° F, (2) thereafter heating the resulting material for a period of from 3 to 300 minutes at a temperature in the range from 775° to 975° F (413° to 524° C) under a pressure of from 15 to 30 atmospheres, and finally (3) flash distilling the heated material to separate therefrom that portion thereof which must be removed to leave the remainder as a petroleum pitch with a softening point in the range from 175° to 275° F (79° to 135° C).

4,013,541

METHOD AND APPARATUS FOR WAX DEOILING

Roy E. Irwin, 1456 Lakeshore Highway East, Oakville, Ontario, Canada, and Alfred Aufhauser, 8 E. 83rd St., New York, N.Y. 10028

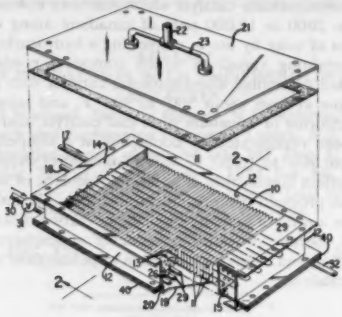
Continuation-in-part of Ser. No. 484,217, June 28, 1974, Pat. No. 3,926,776. This application Dec. 9, 1975, Ser. No. 639,201

Int. Cl.² C10G *43/04*

U.S. Cl. 208—32 **8 Claims**

1. In a method of separating lower melting point constituents from higher melting point constituents contained in a wax composition wherein said wax composition is confined in solid state between a succession of vertically disposed plates and said lower melting point constituents are removed therefrom by gradually increasing the temperature of said plates responsive to controlled increase in the temperature of a fluid flowed through a multiplicity of conduits that traverse said spaces and said plates in thermally conductive relation to said plates with concomitant increase in the temperature of said wax composition confined between said plates accompanied by drainage of said lower melting point constituents from said composition, the improvement which comprises introducing said wax composition in the melted state into spaces between the plates which are separated from each other by a distance of about

one-sixteenth to one half-inch and into a container adapted and disposed to maintain a body of said wax composition that is of substantial depth below the lower margins of said plates until said container contains a body of said wax composition that is in contact with the lower margins of said plates and until the depth of the wax composition between said plates is between about 4 and about 24 inches, lowering the temperature of said plates with concomitant solidification of the wax composition in the spaces between said plates, removing said body of wax composition from said container while the wax



composition in the spaces between said plates is in the solid state, gradually raising the temperature of said plates with concomitant rise in the temperature of the wax composition in said spaces accompanied by draining of lower melting point constituents from said spaces and recovering said lower melting point constituents that drain from said spaces separated from higher melting point constituents retained within said spaces and thereafter melting said higher melting point constituents and recovering them separated from said lower melting point constituents.

4,013,542

PARTIAL PREDILUTION-DILUTION CHILLING

David A. Gudelis, and David H. Shaw, both of Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 284,647, Aug. 29, 1972, Pat. No. 3,850,740. This application Oct. 21, 1974, Ser. No. 516,625

The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C10G *43/08*

U.S. Cl. 208—33 **7 Claims**

1. A process for dewaxing a waxy petroleum oil feedstock comprising a waxy, deasphalted and topped crude oil the major portion of which boils above about 650°F. and which contains at least about 10 wt. % of residual material which process comprises:

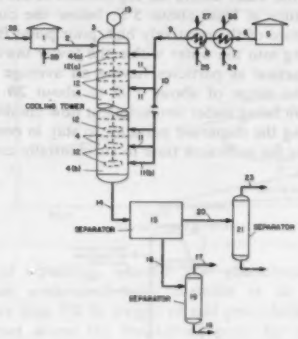
a. mixing said oil stock with between about 0.3 and 2 volumes of a predilution solvent per volume of said oil stock, thereby depressing the cloud point of said oil stock and forming a first mixture comprising said predilution solvent and said oil stock;

b. introducing said first mixture at a temperature above the depressed cloud point of said oil stock into a cooling zone divided into a plurality of stages and passing said mixture from stage to stage of said cooling zone;

c. introducing dewaxing solvent into at least a portion of said cooling zone at a plurality of spaced points therealong;

d. mixing said dewaxing solvent with at least a portion of said first mixture as it passes from stage to stage of said cooling zone under conditions of high agitation, thereby forming a second mixture comprising said dewaxing solvent, said predilutionsolvent and said oil stock; and

e. cooling said oil stock contained in said second mixture as



it passes from stage to stage of said cooling zone, thereby reducing the temperature of said oil stock to below its depressed cloud point and precipitating at least a portion of said wax therefrom under said conditions of high agitation.

4,013,543

UPGRADING SOLID FUEL-DERIVED TARS PRODUCED BY LOW PRESSURE HYDROPYROLYSIS

Marvin Greene, Somerset, N.J., assignor to Cities Service Company, Tulsa, Okla.

Continuation-in-part of Ser. No. 623,692, Oct. 20, 1975, Pat. No. 3,997,423. This application Dec. 15, 1975, Ser. No. 640,619

Int. Cl.² C10B *55/00*

U.S. Cl. 208—50 **9 Claims**

1. A process of producing and upgrading carbonaceous tars comprising, in serial combination,

a. adding liquid or crushed solid carbonaceous material to a reactor,

b. adding hot hydrogen to the stream of carbonaceous material,

c. reacting the hydrogen and the carbonaceous material at a pressure between atmospheric pressure and 250 psia. and a temperature between about 400° and about 2,000° C,

d. quenching the mixture, with the total residence time for heat-up, reaction and quenching varying from about 2 milliseconds to about 2 seconds,

e. processing said quenched reaction mixture to form a cold tar stream, and

f. introducing said cold tar stream of step (e) into a fluid coking zone to obtain gas, upgraded carbonaceous tars, and hot coke.

4,013,544

METHOD FOR MAKING AND SLURRYING WAX BEADS

LaVaun S. Merrill, Jr., Englewood, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 289,918, Sept. 18, 1972, Pat. No. 3,846,279. This application Aug. 21, 1974, Ser. No. 499,370

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

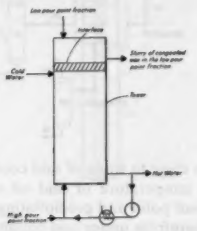
Int. Cl.² F17D *1/16*

U.S. Cl. 208—93 **31 Claims**

1. A process for transporting a hydrocarbon mixture as a slurry, the process comprising:

1. fractionating the hydrocarbon mixture into at least a relatively low pour point fraction and a relatively high pour point fraction,

2. introducing at least a portion of the relatively high pour point fraction into the bottom of a tower having a continuous stream of water flowing countercurrent to the introduction of the relatively higher pour point fraction and wherein the water enters the top portion of the tower at a temperature at least about 5°F. below the congelation temperature of the relatively high pour point fraction,
3. dispersing into the water within the tower the high pour point fraction as particles having an average diameter within the range of about 0.05 to about 20 mm, said dispersion being under nonturbulent flow conditions, and permitting the dispersed particles to stay in contact with the water for sufficient time to substantially congeal the particles,



4. passing the resulting congealed particles through an interface, the interface being the juncture between a liquid hydrocarbon comprised of the low pour point fraction introduced into the top of the tower, and the water within the tower,
5. withdrawing at least a portion of the resulting slurry of the congealed particles in the liquid hydrocarbon at about the interface and thereafter transporting the slurry at temperature below those which bring about substantial solution of the congealed particles in the liquid hydrocarbon.

10. The process of claim **1** wherein an equivalent amount of up to about 50% by weight of the high pour point fraction is cracked before it is dispersed into the tower.

4,013,545

HYDROGENATION OF HYDROCARBONS UTILIZING A PRETREATED COBALT-MOLYBDENUM CATALYST

Lee Hilfman, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 597,627, July 21, 1975, Pat. No. 3,981,796, which is a continuation-in-part of Ser. No. 418,700, Nov. 23, 1973, Pat. No. 3,933,683. This application July 22, 1976, Ser. No. 707,722

Int. Cl.² C10G *13/06*; B01J *27/04*; C07C *5/10*

U.S. Cl. 208—111 **4 Claims**

1. A hydrocracking process utilizing a catalyst containing cobalt and molybdenum components present in oxide form which catalyst is activated according to a method which comprises the steps of:

a. intimately contacting said hydrocracking catalyst with gaseous hydrogen, containing a sulfur compound, at a temperature within the range of from about 550° to about 800° F. for a sufficient time to effect the reduction and sulfiding of a major portion of said components; and,
b. stripping the resulting reduced and sulfided catalyst with substantially pure hydrogen at a temperature within the range of from about 750° to about 900° F.

4,013,546

REMOVING METAL CONTAMINANT FROM REGENERATED CATALYST IN CATALYTIC CRACKING PROCESS

Robert M. Suggitt, Wappingers Falls, N.Y., and Peter L. Paull, Weston, Conn., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 489,878, July 19, 1974, Pat. No. 3,985,639. This application Jan. 26, 1976, Ser. No. 652,583

Int. Cl.² B01J *37/22*; C10G *11/04*

U.S. Cl. 252—415 **14 Claims**

1. A method for removing metal contaminant from a crystalline aluminosilicate catalyst which has been contaminated with from 2000 to 15,000 ppm of vanadium along with the deposition of coke by use in converting a hydrocarbon feedstock containing vanadium which comprises contacting a regenerated crystalline aluminosilicate catalyst with molecular chlorine at from about 500° to 900° F. and separating a volatile chloride of vanadium from said catalyst, said catalyst having been regenerated by contacting at a temperature of from about 900° to 1,350° F. with an amount of oxygen sufficient to effect combustion of at least 85 percent of said coke to gaseous products comprising carbon monoxide and carbon dioxide in a ratio of carbon monoxide to carbon dioxide of at least 1:4 thereby providing a reducing atmosphere during regeneration and deterring formation of pentavalent vandium on said catalyst.

4,013,547

DESULFURIZATION OF RESIDUAL PETROLEUM OILS WITH A CATALYST CALCINED AT HIGHER TEMPERATURES

Grant A. Mickelson, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jan. 22, 1976, Ser. No. 651,560

Int. Cl.² C10G *23/02*

U.S. Cl. 208—216 **7 Claims**

1. A process for the hydrodesulfurization of a residual petroleum feedstock, which comprises contacting said feedstock in admixture with added hydrogen at elevated desulfurization temperatures and pressures with a catalyst consisting essentially of a sulfided composite of about 1–7 weight-percent CoO and 8–16 weight-percent MoO_3 supported on a carrier consisting essentially of activated alumina, said catalyst being further characterized by:

a. a total surface area between about 150 and 350 m^2/g;
b. a total pore volume between about 0.3 and 0.8 ml/g, at least about 40% of said pore volume being in pores of 75–100 A diameter; and
c. a pore volume in pores about 100 A diameter of between about 0.01 and 0.1 ml/g;

said catalyst having been calcined at a temperature between about 1250° and 1400° F prior to said contacting.

4,013,548

HYDROPROCESSING OF HYDROCARBONS

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 672,183, March 31, 1976, which is a continuation-in-part of Ser. No. 538,240, Jan. 2, 1975, Pat. No. 3,957,624. This application Aug. 19, 1976, Ser. No. 715,813

Int. Cl.² C10G *23/04*; B01J *23/58*

U.S. Cl. 208—255 **3 Claims**

1. A process for hydrogenating a coke-forming hydrocarbon distillate containing di-olefinic and mono-olefinic hydrocarbons, and aromatics, which process comprises reacting said distillate with hydrogen, at a temperature below about 500° F., in contact with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.5 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % germanium and about 0.1 to about 3.5 wt. % halogen, wherein the platinum

group metal, cobalt and germanium are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal is present in the elemental metallic state, wherein substantially all of the germanium is present in an oxidation state above that of the elemental metal, and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states, and an alkali metal component, and recovering an aromatic/mono-olefinic hydrocarbon concentrate substantially free from conjugated di-olefinic hydrocarbons.

4,013,549
LUBE EXTRACTION WITH NMP/PHENOL/WATER MIXTURES

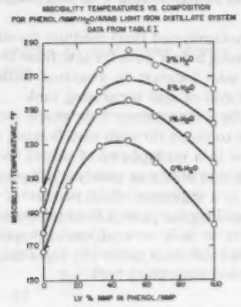
James D. Bushnell, Berkeley Heights, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 311,287, Dec. 1, 1972, abandoned. This application June 5, 1974, Ser. No. 476,542

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C10G *21/06*

U.S. Cl. 208—323 **20 Claims**


MISCIBILITY TEMPERATURES VS. COMPOSITION
FOR PHENOL/NMP/H2O/ARAB LIGHT IRON DISTILLATE SYSTEM
DATA FROM TABLE I
MISCIBILITY TEMPERATURE, °F
LV % NMP IN PHENOL/NMP

1. A process for upgrading a lubricating oil stock which comprises:

1. contacting said lubricating oil stock with a solvent comprising n-methyl-2-pyrrolidone and phenol wherein the amount of phenol in said solvent ranges between about 20 and 80 LV% based on the total amount of n-methyl-2-pyrrolidone and phenol in the solvent;
2. forming an extract phase and a raffinate phase; and
3. recovering an upgraded lubricating oil from said raffinate phase.

4,013,550
MANUFACTURE OF THERMOPLASTIC RESIN BEADS

Richard C. Weil, Monroeville, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

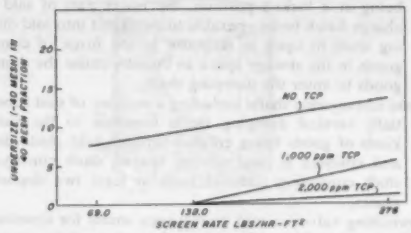
Filed July 22, 1975, Ser. No. 598,088

Int. Cl.² B03B *1/04*

U.S. Cl. 209—9 **12 Claims**

1. In a method for classifying solid thermoplastic resin particles into predetermined fractions of differing sizes which sizes are within the range of minus 6 (−6) to plus 120 (+120) U.S. sieve and recovering the same, wherein said particles are combined with a finely divided inorganic salt selected from the group consisting of alkali and alkaline earth metal carbonates, phosphates, complexes of said carbonates and said phosphates, and mixtures of said carbonates, phosphates and said complexes, followed by dry dynamic screening said mixture to separate said particles into preselected fractions and recovering said fractions, the improvement comprising:

conducting said screening at a rate of from 27 to 690 lbs/hr-ft² of said mixture and the weight ratio of said salt to said particles being at least 500 and up to 3000 ppm of said salts and said weight ratio also being an amount above the breakdown point in classification of the particles for such



rate of screening; wherein said pre-selected fractions contain undersized resin particles in an amount no greater than 5% by weight of said pre-selected fractions. At least above the breakdown point for such rate of screening and up to 3,000 ppm of said salts.

4,013,551
DEVICE FOR SORTING OF GOODS

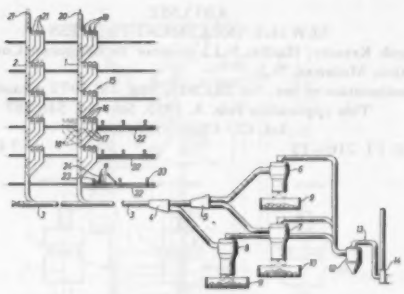
Sergio de Feudis, Nacka, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Stockholm, Sweden

Filed Jan. 8, 1975, Ser. No. 539,386

Claims priority, application Sweden, Jan. 31, 1974, 7401308

Int. Cl.² B65G *51/02*

U.S. Cl. 209—73 **5 Claims**



1. An arrangement for collecting, conveying and sorting material such as refuse or laundry into various kinds of goods, said material being transported in conveyance shafts from a number of depositing places to a common collecting place with separate containers for the various kinds of goods, comprising:

a number of chute doors at each depositing place, the number of doors corresponding to the various kinds of goods being handled;

at least one storage space for each kind of goods being located immediately inside the corresponding chute door in order to collect the goods after being entered through said chute door each storage space ending in a substantially vertical dumping shaft and having a lower sliding surface being directed obliquely downwards towards said dumping shaft;

a discharge hatch for closing a discharge opening of each storage space, said hatch being kept in closed position by means of a locking mechanism, the discharge hatch forming part of an inner wall surface of said substantially vertical dumping shaft, the locking mechanism maintaining the discharge hatch closed and allowing a certain

amount of goods to be collected before the storage space is emptied, which occurs at disengagement of said locking mechanism, said discharge hatch being pivoted at its upper margin on a substantially horizontal axis so as to close the discharge opening of the storage space when being at a locked position, the lower part of said discharge hatch being operable to swing out into said dumping shaft to open in response to the force of dumped goods in the storage space to thereby cause the dumped goods to enter the dumping shaft;

said conveyance shafts including a number of said substantially vertical dumping shafts common to the various kinds of goods being entered through said chute doors, and collisted in said storage spaces, each conveyance shaft conveying material from at least two depositing places;

switching valves in said conveyance shafts for distributing the various kinds of goods to the corresponding containers;

means for controlling the disengagement of said locking mechanisms and the position of said switching valves in order to connect said storage spaces for one and the same kind of goods through the conveyance shafts with the corresponding container.

4,013,552

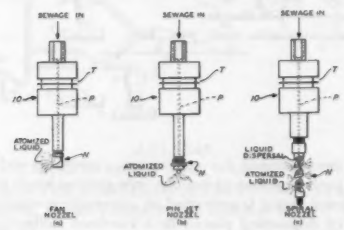
SEWAGE TREATMENT PROCESS

Jacob Kreuter, Hazlet, N.J., assignor to Ecquacon Corporation, Matawan, N.J.

Continuation of Ser. No. 281,843, Aug. 18, 1972, abandoned. This application Feb. 3, 1975, Ser. No. 546,287

Int. Cl.² C02C *1/02, 5/04*

U.S. Cl. 210—12 **7 Claims**



1. The process of sonobioaeration for treating sewage utilizing an electroacoustic horn, said sewage including liquid, solid organic matter and aerobic organisms comprising the steps of:

exposing said electroacoustic horn to air;

converting said sewage to a thin film;

applying said thin film of sewage to the surface of said electroacoustic horn; and

transmitting ultrasonic energy with said electroacoustic horn to said thin film of sewage, in the presence of said air, to atomize the thin film of sewage to reduce the particle size of said liquid and enrobe said reduced liquid particles with said air to provide said aerobic organisms with additional oxygen, derived from said air, for said aerobic organisms to utilize in the process of bio-chemical oxidation whereby said aerobic organisms convert said organic matter to a more stable compound.

4,013,553

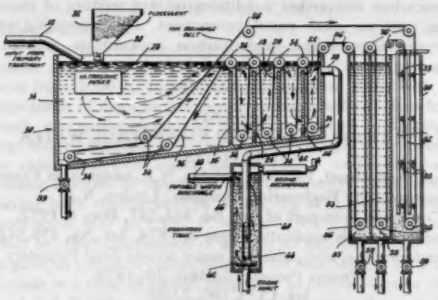
FLUID TREATMENT METHOD

Eskil L. Karlson, Stamford, Conn., assignor to Iconex Systems Incorporated, Stamford, Conn.

Division of Ser. No. 448,019, March 4, 1974, Pat. No. 3,912,636. This application June 4, 1975, Ser. No. 583,788

Int. Cl.² C02C *9/02*

U.S. Cl. 210—28 **5 Claims**



1. A method for separating and receiving selected materials from fluid medium contaminated with said materials comprising:

flowing said contaminated fluid medium through a separating tank forming a flow path for said fluid to be processed from a first inlet location to a second outlet location at the opposite end of said separating tank

causing an endless foraminous belt which includes ion exchange resin to move through said flowing contaminated fluid medium in a multiplicity of serpentine transversals and in a direction such that said belt will pass through said transversals in a sequence which is counter directional to the flow of said contaminated fluid medium from the first inlet location to said second outlet location, whereby purified fluid medium is caused to exit said second outlet location of said separating tank.

4,013,554

METHOD AND APPARATUS FOR PURIFYING WATER CONTAMINATED WITH ANODICALLY OXIDIZABLE ORGANIC MATTER

August Reis; Karl-Ernst Quentin, and Ludwig Weil, all of Munich, Germany, assignors to Sachs-Systemtechnik GmbH, Schweinfurt am Main, Germany

Filed May 13, 1975, Ser. No. 577,044

Claims priority, application Germany, May 17, 1974, 2424091

Int. Cl.² B01D *15/06*

U.S. Cl. 210—40 **6 Claims**

1. A method of purifying water contaminated with anodically oxidizable organic matter which comprises:

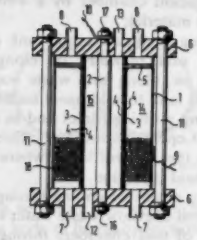
a. agitating said contaminated water with particulate, electrically conductive, hydrophilic, carbonaceous material capable of adsorbing said organic matter at a rate sufficient to produce turbulent movement of said material in the mixture so produced; and

b. contacting said mixture with the electrically conductive surface of a body while a potential applied to said surface and to said water makes the surface anodic relative to said contaminated water,

1. said rate being sufficient to cause only intermittent contacting between said material and said surface,

2. said intermittent contacting being continued until a

portion of said organic matter adsorbed on the particles of said material is destroyed by passage of current from



said particles to said water during said intermittent contacting.

4,013,555

PROCESS FOR REDUCING BOD IN FOOD PROCESSING PLANT WASTES

William R. Davis, Richmond, Va., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Mar. 24, 1976, Ser. No. 669,931
Int. Cl.² C02B *1/20*
U.S. Cl. 210—51 **2 Claims**

1. A process for reducing BOD in the form of soluble proteinaceous material in aqueous food processing plant wastes which comprises subjecting such wastes to the following series of sequential steps:

A. adjusting the pH of the waste to 3 or less to form finely divided suspended particles;

B. readjusting the pH of the waste with sodium aluminate to a value within the range of 6–7.5;

C. flocculating the particles with an anionic acrylamide polymer; and then

D. removing and collecting the flocculated particles from the food processing plant wastes.

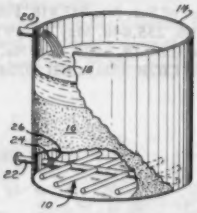
4,013,556

COMBINATION FLOW DISTRIBUTION AND COLLECTION APPARATUS

Thomas W. Evans, Houston, Tex., assignor to UOP Inc., Des Plaines, Ill.

Filed Aug. 19, 1976, Ser. No. 715,814
Int. Cl.² B01D *23/20*
U.S. Cl. 210—136 **8 Claims**

1. An apparatus for distributing fluid flow in one direction at one flow rate and collectng it in another direction at another flow rate comprising pipe means having an opening at one end through which fluid can enter or leave said apparatus and first and second sets of openings in the walls thereof, the first said set of openings permitting flow in either direction through said walls depending on whether the fluid is being distributed or collected, the second said set of openings having valve means associated therewith which are self-closing in one direction of flow and self-opening in the other direction of flow, and perforated screen means concentrically positioned about said pipe means for preventing solid particles in the



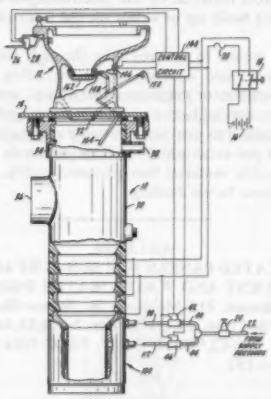
fluid being collected which are larger than the screen perforations from being drawn into the pipe means.

4,013,557

SEWAGE TREATMENT APPARATUS

James D. Snodgrass, Darien, and Joseph J. Pilolla, Elmhurst, both of Ill., assignors to Sloan Valve Company, Franklin Park, Ill.

Filed June 6, 1975, Ser. No. 584,508
Int. Cl.² C02B *3/06*
U.S. Cl. 210—138 **27 Claims**

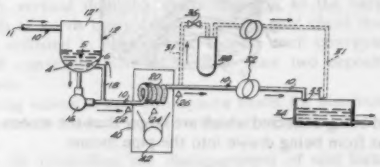


1. A sewage treatment apparatus comprising a casing having an inlet for reception of sewage and a discharge outlet, valve means adjacent said discharge outlet, a plurality of electrodes positioned about said casing between said valve means and inlet for providing an electrical potential to electrolytically treat sewage in said casing thereby rendering it substantially sterile, said electrodes and the interior of said casing defining a substantially open and unobstructed central treatment zone, means for closing said valve means to temporarily hold a batch of sewage within said zone, means for introducing a fluid under pressure into the casing at said central treatment zone and adjacent said electrodes to provide agitation and turbulence within the treatment zone resulting in a substantially homogeneous sewage liquid, means defining a plurality of projections positioned about said treatment zone and adjacent said electrodes to assist in reducing the sewage, and means for opening said valve means to discharge the batch of treated sewage.

4,013,558
SYSTEM FOR PURIFYING LIQUIDS

H. Colman Rosenberg, 1921 NE. 185th Terrace, North Miami Beach, Fla. 33161

Continuation-in-part of Ser. No. 443,416, Feb. 19, 1974, abandoned, and Ser. No. 255,646, May 22, 1972, abandoned. This application Mar. 18, 1975, Ser. No. 559,427
Int. Cl.² C02B 3/06; C02C 5/06
U.S. Cl. 210—149 5 Claims



1. A treatment system for flowable materials composed of liquids and solids which includes:

A. a line for the flow, said line having an upstream with a main inlet and a downstream with a main outlet;

B. mixing means in the line to maintain a relatively uniform consistency of the materials; and

C. purifying means arranged downstream of said mixing means and including a microwave generator, and guide means to direct electromagnetic energy in a path toward a target area of said purifying means,

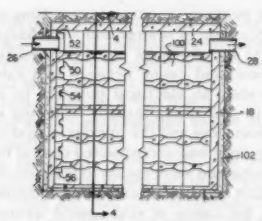
D. said line including a pattern in the target area to conduct flow of the flowable material, said pattern comprising a coil which is convoluted to define a whirling or turbulent flow pattern of the flowable material to impart a mixing and wiping action within said coil for even excitation of the flowable material by the electromagnetic energy and to prevent build up of solids on the interior of said coil; and

E. control means to control flow through said line in the target area, said control means including temperature sensing means to measure differential temperature of flowable material between the upstream and downstream coil zones and to provide a variable exposure time consistent with pre-established sterilization needs of the particular flowable material being treated and to maintain the temperature below boiling.

4,013,559
PREFABRICATED PANELS FOR SUB-SURFACE SEWAGE EFFLUENT AND WASTE WATER DISPOSAL

Rollin W. Johnson, 215 Magnolia St., Statesville, N.C. 28677

Filed Nov. 19, 1975, Ser. No. 633,442
Int. Cl.² B01D 21/24; C02C 5/04
U.S. Cl. 210—151 16 Claims



2. A ground absorption system for disposing of subsurface sewage effluent and waste water emitted from septic tanks which receives effluent from a source in a conventional manner comprising:

a. at least one panel section, including:

i. a top wall, bottom wall, end walls, and side walls and formed of a strong, porous cementitious material;

ii. a plurality of elongated chambers including an uppermost, lowermost, and at least one intermediate chamber arranged one above the other within said section, each of said chambers being at least partially separated from the adjacent chamber by a web of said porous cementitious material;

b. a pipe extending from said septic tank directly into the uppermost of said plurality of elongated chambers through which air, along with waste water, is delivered from said septic tank to said panel section;

c. said pipe having a divided inlet end in said septic tank including a first opening above the effluent and a second opening below the effluent level, whereby both air and effluent enter said pipe; and

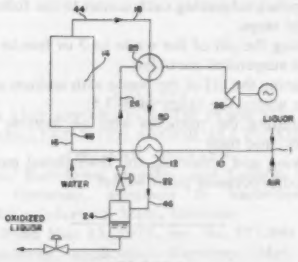
d. communicating means extending through said webs for delivering air and overflow waste water to the intermediate and lower of said chambers throughout said panel section.

12. A prefabricated panel for receiving sewage effluent and waste water from a septic tank in a ground disposal circulation system comprising an elongated narrow housing formed of a porous cement material and having top and bottom walls, end walls, and side walls, a plurality of vertically spaced, cement, separator webs extending between the side walls along the length of said housing to form an upper, lower, and at least one intermediate elongated chamber; an inlet through one of said end walls into said upper chamber through which a pipe from said septic tank extends whereby said effluent and waste water is introduced into the housing; and a communicating means extending through said webs and interconnecting said chambers for introducing air, effluent and selected other materials into any of said intermediate or lower chambers.

4,013,560
ENERGY PRODUCTION OF WET OXIDATION SYSTEMS

Louis A. Pradt, Wausau, Wis., assignor to Sterling Drug Inc., New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,942
Int. Cl.² C02C 5/04
U.S. Cl. 210—152 9 Claims



1. A wet oxidation apparatus comprising a reactor, a preheater therefor, and means to recover power, means supplying liquor and air through the preheater to the reactor, means cooling the oxidized products from the reactor to a point close to the temperature of the air and liquor supplied, means separating the liquid and gas phases at the lower temperature,

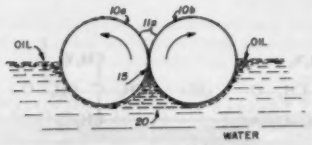
means injecting a controlled amount of water into the relatively dry and cool gas stream from the separating means, means heating said gas stream with the products from the reactor to substantially completely vaporize the water injected, or completely vaporize and superheat the water injected, means delivering the gas stream so generated to the means for recovering power,

the reactor stream cooling means comprising a heat exchanger heating the separated water injected gas phase, the preheater being heated by the reactant stream after leaving the cooling means.

4,013,561
SEPARATORS

Herman H. Murphy, Box 61945, Sunnyvale, Calif. 94088

Continuation-in-part of Ser. No. 249,919, May 3, 1972, abandoned. This application Sept. 17, 1974, Ser. No. 506,716
Int. Cl.² E02B 15/04
U.S. Cl. 210—222 23 Claims



1. A skimming separator for scavenging floating matter from the face of a body of liquid by frictional tractive conveyance, which comprises in cooperative combination:

a supporting structural frame means;

motor means;

a pair of contiguous cylinders **10** rotatably mounted on the frame means and rotated in opposite directions by the motor means, with the side of at least one of the pair of rotating cylinders **10** having a rough textured frictional traction surface material **11** thereon which traction surface material comprises a surface of discrete abrasive elements which is advanced in recirculation with rotation of the cylinders **10** and subjected to a compressive force in passing through a nip **15** formed between the pair of contiguous counter-rotating cylinders **10**, the cylinders being mounted for moving the rough frictional traction surface through the proximate floating matter and through an upper layer of liquid and continuing moving through the liquid toward the nip, whereby partial immersion of the advancing traction surface **11** in a body of liquid frictionally engages a contacting layer of the liquid and tractively conveys the upper layer of the liquid and proximate matter floating thereon within the body of liquid directly into a collection reservoir **20** which is formed and confined in part by the advancing traction surface **11** and in part by the body of liquid, wherein the conveyed layer of liquid and floating matter is substantially retained by being at least partially prevented from further tractional conveyance by being compressed and squeezed off the traction surface **11** in passage through the nip **15** between the pair of contiguous cylinders **10**, whereupon the traction surface **11** thereby becomes sufficiently regenerated for tractively conveying additional quantities of the upper layer of the liquid and proximate matter floating thereon during the subsequent recirculation of the traction surface **11** with rotation of the cylinders **10**, thereby continually skimming floating matter from the face of the liquid by frictional tractive conveyance and separating the scavenged floating matter skimmed from the upper layer of the liquid by confinement within the collection reservoir; and a guard screen at least partially immersed in the liquid and in a spaced clearance position relative to the advancing traction surface with means connecting the guard screen with the frame means, whereby excessive quantities of solid matter are prevented from entering between the cylinders.

4,013,562
PORTABLE WATER FILTER

Willie Gray Gott, 11311 Renee Ave., The Foothills, Yuma, Ariz. 85364

Filed Nov. 3, 1975, Ser. No. 628,579
Int. Cl.² B01D 39/04, 35/02
U.S. Cl. 210—232 8 Claims

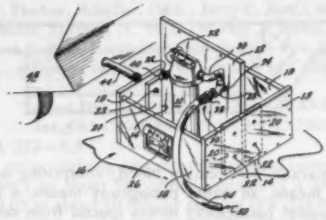
1. A portable water filter comprising:

a base member;

a plurality of vertical side wall members fixedly attached to said base member and perpendicular thereto forming an open ended container therewith;

holding means positioned along the inner surfaces of two of said vertical side walls;

a removable cover member covering the open end of said container and providing a support member when secured within said container by said holding means;



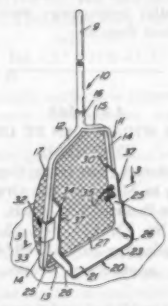
water filter means mounted to the inner surface of said cover member, said filter means being in a stored position when said cover is positioned as a closure for said container and in an operable position when said cover member is positioned as a support member; and

input and output conduit means for delivering unfiltered water to said filter means and removing filtered water therefrom.

4,013,563
SWIMMING POOL STRAINER CONSTRUCTION

Albert V. Petrik, 2866 Joyce Road, Roslyn, Pa. 19001

Filed May 8, 1975, Ser. No. 575,592
Int. Cl.² B01D 33/34
U.S. Cl. 210—407 10 Claims



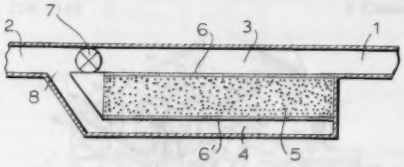
1. The combination with a swimming pool strainer including a handle, an open frame having a front face and extending from the handle, and net means across the frame, of a blade extending across and in front of a lower region of said frame spaced above the lower edge thereof for location adjacent to and spaced above a pool bottom upon forward strainer movement, said blade having a leading edge and a trailing edge and being generally rearwardly obliquely inclined from said leading edge to said trailing edge to effect hydrodynamic upward flow of water and sediment into said net means without scraping.

4,013,564

MULTIPURPOSE METABOLIC ASSIST SYSTEM

Yukihiko Nose, Cleveland Heights, Ohio, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 17, 1975, Ser. No. 559,395
Int. Cl.² B01D 31/00
U.S. Cl. 210—434 **14 Claims**



1. An apparatus for treating blood, comprising an inlet passageway means, an outlet passageway means, a treated blood component passageway means spaced from said inlet passageway means and being connected directly to said outlet passageway means, said apparatus having at least one space between at least a portion of said inlet passageway means and a portion of said treated blood component passageway, a particulate treatment agent for treating a component of the blood for removing undesirable materials from the blood, said agent being taken from the group consisting of an adsorption agent, a decomposition agent, an agent reacting chemically for removal of the undesirable materials and an agent reacting biologically for removal of the undesirable materials, said treatment agent being packed in said space, at least a portion of the inlet passageway means and the treated blood component passageway means which face said space being constituted by a porous membrane having pores of a size smaller than the size of the particles of the treatment agent and of the size for passing a component of the blood to be treated, and blocking passage of the remainder of the blood, and flow obstruction means for producing an increased pressure in said inlet passageway means, whereby when blood is supplied to the inlet passageway means, only the component of the blood to be treated is passed through the membrane of the inlet passageway means and said treatment agent, and the component is treated and the treated component from which the undesirable material has been removed is passed through the membrane of the blood component passageway and is collected in the treated blood component passageway means and supplied to said outlet passageway means and rejoins the remainder of the blood therein.

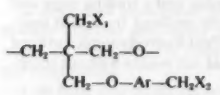
4,013,565

POLYOXETANES WHICH CAN BE USED IN PEPTIDE SYNTHESIS

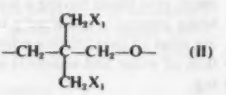
Jean Bouchaudon, Morsang sur Orge; Guy Bourat, Bourg-la-Reine, and Rodolphe Margraff, Ris Orangis, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Division of Ser. No. 335,177, Feb. 23, 1973, Pat. No. 3,847,868. This application July 31, 1974, Ser. No. 493,474
Claims priority, application France, Feb. 28, 1972, 72.06696
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² B01D 31/00
U.S. Cl. 210—500 M **12 Claims**

1. A membrane consisting of a polyoxetane which consists of essentially of a plurality of units of the formula:



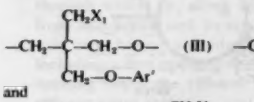
(I)



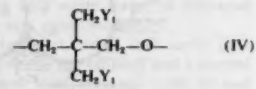
(II)

and

and, optionally, of units of at least one of the formulae:

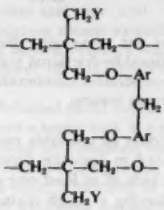


(III)



(IV)

and



(V)

in which:

each of X_1 and X_2, which may be identical or different, represents a chlorine or bromine atom,

Y as defined under X_1 or represents a radical of formula: —O—Ar—CH_2X_2 or —O—Ar′,

each of the Y_1 radicals, which may be identical or different, represents a —O—Ar′ or —O—Ar—CH_2X_2 radical,

Ar represents a divalent aromatic radical, the two free valencies of which are carried by carbon atoms of one or two aromatic benzene rings and

Ar′ represents the radical —ARH,

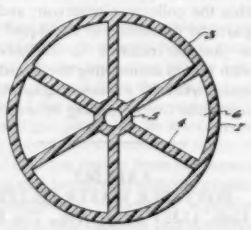
the units (I) to (V) being connected to one another via the oxygen atom with a free valency of one of the units and a methylene group with a free valency of the adjacent unit, and a screen reinforcement.

4,013,566

FLEXIBLE DESICCANT BODY

R. Daniel Taylor, North Ridgeville, Ohio, assignor to Adsorbex, Incorporated, North Ridgeville, Ohio

Filed Apr. 7, 1975, Ser. No. 565,544
Int. Cl.² B01D 27/04
U.S. Cl. 210—502 **21 Claims**

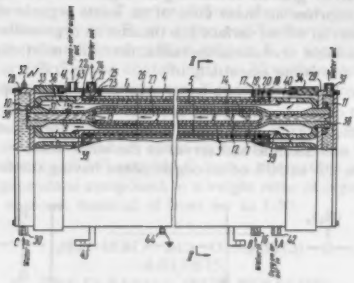


1. A flexible solid desiccant body comprising finely divided particles of desiccant material homogeneously distributed and encapsulated in a moisture transmissive polymer solid matrix of a cured thermoset aliphatic epoxy resin.

4,013,567
HIGH-FREQUENCY TUBULAR OZONIZER

Jury Mikhailovich Emelyanov, Chertanovskaya ulitsa, 63, korpus 1, kv. 62, and Mikhail Fedorovich Emelyanov, Schelkovskoe shosse, 69, kv. 43, both of Moscow, U.S.S.R.

Filed July 31, 1975, Ser. No. 600,863
Int. Cl.² C01B *13/11*
U.S. Cl. 250—540 **3 Claims**



1. A high frequency tubular ozonizer comprising a hollow housing, at least one ozonizing element accommodated in said housing, said ozonizing element including a low voltage tubular electrode formed by two coaxial disposed pipes and adapted to be cooled by a flowing liquid, the output pipe forming a cooling jacket with said housing and adapted to render the flow of the cooling liquid turbulent and increasing the intensity of cooling of said low voltage electrode, and a high voltage tubular electrode coaxially arranged inside the low voltage tubular electrodes in the form of a pipe of a varying cross-section having a middle expanded portion, a flange at one end thereof and a thread at the other end thereof and a core for rendering turbulent the flow of the cooling liquid and increasing the intensity of cooling of said high voltage electrode disposed in the middle expanded portion of the high voltage electrode; the opposing surfaces of the pipes of the low voltage and the high voltage electrodes forming a discharge zone, at least one of the surfaces of said pipes being coated with a layer of dielectric, two manifolds forming the butt ends of said housing and adapted for supplying and discharging, respectively, the cooling liquid to and from said high voltage electrode, at least two insulating, cup-shaped centering bushings having openings in the walls and bottom thereof disposed on the ends of the pipe of said high voltage electrodes and centering said high voltage electrode inside said low voltage electrode, branch pipe means for supplying cooling liquid to said low voltage electrode installed on the housing, two diaphragms arranged in parallel and installed between said housing and said outer pipe of said low voltage electrode, said outer pipe having an opening in the interval between said diaphragms, the space formed by said diaphragms opposite said branch pipe and from which space cooling liquid flows to the water jacket of said low voltage electrode, branch pipe means for discharging said cooling liquid from said low voltage electrode on said housing, two diaphragms arranged in parallel and installed between said housing and said outer pipe of the low voltage electrode, said outer pipe having an opening in the interspace between said diaphragms which form a space located opposite the second mentioned branch pipe, the cooling liquid from said water jacket being discharged from the ozonizer via said second mentioned branch pipe, two annular insulating bushings disposed respectively between each of said manifolds and the butt ends of said housing and along the perimeter thereof, said bushings, said butt ends and said manifolds in combination forming two spaces, the gas to be ozonized being fed from one of said spaces via an opening in one of said centering bushings to the discharge zone of each ozonizing element and the ozonized gas flowing to the other of said spaces from said discharge zones and from the ozonizer through said second mentioned branch pipe.

4,013,568
COMPOSITION AND METHOD FOR DRILLING FORMATIONS CONTAINING GEOTHERMAL FLUID

Paul W. Fischer, Whittier, Calif.; Jerry C. Jones, deceased, late of Memez Springs, N. Mex. (Shirley J. Jones, executrix); Delbert E. Pyle, Northridge, and Stephen Pye, Brea, both of Calif., assignors to Union Oil Company of California, Brea, Calif.

Filed Dec. 11, 1975, Ser. No. 639,652
Int. Cl.² C09K *7/08*, *7/02*; E21C *7/06*
U.S. Cl. 252—8.5 C **15 Claims**

1. A gas-containing aqueous drilling fluid comprising from about 99.5 to about 90 volume percent of a gas and from about 0.05 to about 10 volume percent of a clay-free aqueous dispersion containing from about 327 to about 347 pounds per barrel water, from about 10 to about 2 pounds per barrel lignite, from about 2.5 to about 0.5 pounds per barrel alkali metal or ammonium salt of a homopolymer of acrylic acid or a copolymer containing at least about 90 percent by weight acrylic acid and up to about 10 percent by weight acrylonitrile, methyl acrylate, ethyl acrylate or 2-methyl propanoic acid, which homopolymers and copolymers have an average molecular weight of 5,000 to 50,000 and from about 0.011 to 1 gallon per barrel of a mixture consisting essentially of a carrier liquid containing about 0.001 to 25 weight percent of an organic agent which is a tertiary amine having a molecular weight above 250 that releases ammonia or a vaporous amine and forms a resinous residue at downhole temperature and pressure conditions to function as an erosion and corrosion inhibitor.

4,013,569
AQUEOUS ANIONIC SURFACTANT SYSTEMS CONTAINING AROMATIC ETHER POLYSULFONATES

Ying C. Chiu, and Harold J. Hill, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 562,283, March 26, 1975, Pat. No. 3,945,437. This application Oct. 15, 1975, Ser. No. 622,576
Int. Cl.² E21B *43/22*
U.S. Cl. 252—8.55 D **8 Claims**

1. An aqueous anionic surfactant system having a relatively high tolerance to multivalent cations, which system consists essentially of:

a substantially homogeneous aqueous liquid system containing at least one dissolved or dispersed petroleum sulfonate surfactant, at least one dissolved electrolyte that is predominately an alkali metal salt of a halogen acid, and at least one dissolved sulfonated alkyldiphenyl oxide that contains one ether group attached to the aromatic radicals, contains from 1 to 2 alkyl radicals of from 10 to 16 carbon atoms per molecule, and contains at least substantially two sulfonate groups per molecule;

within said aqueous liquid system, proportions of the surfactant and electrolyte capable of providing, at a temperature of from about 50° to 300° F, an interfacial tension between the system and an oil of less than about 0.1 dyne per centimeter; and

within said aqueous liquid system, a proportion of sulfonated alkyldiphenyl oxide which, at temperatures of from about 50° to 300° F, increases the salinity and multivalent cation tolerance of the system and causes the system to be capable of reducing the viscosity and stability of emulsions formed between the system and an oil.

4,013,570

GRAPHITE AND COPPER IN HOT FORGING LIQUID LUBRICANT

Harold G. Lemmer, New Baltimore, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 7, 1975, Ser. No. 565,873
Int. Cl.² C10M *1/10, 3/02, 5/02, 7/04*
U.S. Cl. 252—30 3 Claims

1. In a colloidal graphite-containing, hot forming liquid lubricant for ferrous powdered metal articles, the improvement which comprises including in said lubricant about 2% to 4%, by weight, powdered copper, having a particle size less than about 50 microns, which improvement permits presintering of lubricant-coated ferrous powdered metal preforms at temperatures above about 2050° F.

4,013,571

EXTREME PRESSURE LUBRICATING COMPOSITION CONTAINING THIOSULFINATE EXTREME PRESSURE AGENTS

Ralph P. Williams, and Rector P. Louthan, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 24, 1975, Ser. No. 543,792
Int. Cl.² C10M *1/24*
U.S. Cl. 252—42 5 Claims

1. An extreme pressure lubricant composition comprising a mineral, animal, or vegetable lubricating oil and an amount of t-butyl-t-butylthiosulfinate which imparts improved extreme pressure characteristics to the lubricating oil.

4. A composition in accordance with claim 1 wherein the lubricating oil is present in the form of a lithium-based grease of about 000 to about 6 NLGI grade.

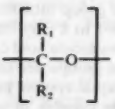
4,013,572

HYBRID FIX SYSTEM INCORPORATING PHOTODEGRADABLE POLYMERS

Dana G. Marsh, Rochester, and John M. Pochan, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 7, 1974, Ser. No. 512,590
Int. Cl.² G03G *9/00*
U.S. Cl. 252—62.1 P 12 Claims

1. A toner comprising a colorant and a photodegradable polymer containing segments satisfying the formula:



wherein R_1 is hydrogen or methyl and R_2 is hydrogen, an alkyl radical of 1 to 6 carbon atoms, a chlorinated or fluorinated aliphatic radical of 1 to 6 carbon atoms or a cyano substituted radical of 1 to 5 carbon atoms provided that when R_1 is methyl R_2 is also methyl, and a photo-oxidant which upon activation by exposure to a degradable amount of activating radiation is capable of abstracting one or more electrons from one or more of the oxygen atoms in said polymer.

4,013,573

CARRIER GRANULE FOR AN ORGANOSILANE

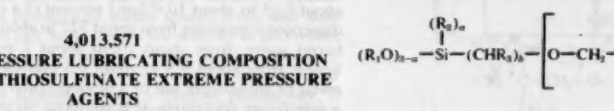
John W. Leikhim, Cincinnati; Edward J. Maguire, Jr., Forest Park; David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 570,536
Int. Cl.² C11D *1/00*
U.S. Cl. 252—89 R 23 Claims

1. A carrier granule containing an organosilane compound which comprises an inner core of an inert, organic or inorganic material whose surface has thereon an organosilane and a water-soluble or water-dispersible, normally solid, nonionic material consisting essentially of:

a. from 25% to 95% of a water-soluble or water-dispersible inert organic or inorganic granular material which is inert to the organosilane, non-hygroscopic, non-electrolytic and non-alkaline and serves as the inner core;

b. from 2% to 50% of an organosilane having the formula



or is a siloxane oligomer thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms,

$(CH_3)_3$ Si or $Z(CH_xH_{2x})_m$

where x is 2 to 4, m is 1 to 20, and Z is hydrogen, an alkyl group containing 1 to 18 carbons or an acyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group containing 1 to 18 carbon atoms; a is 0 to 2; R_3 is hydrogen or an alkyl group containing 1 to 18 carbon atoms; b is 1 to 3, c is 0 or 1; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$(C_xH_{2x}O)_mZ$

where x, m and Z are as defined above, or oxygen provided only one R_4 is oxygen and further provided that there is no X^- when R_4 is oxygen; R_5 is an alkyl, aryl or arylalkyl group containing 1 to 22 carbon atoms; X is bromide or chloride; and Y is nitrogen, sulfur or phosphorus; and

c. from 3% to 70% of a water soluble or water-dispersible, normally solid nonionic material which melts or liquifies between the temperatures of 35° C and 95° C and wherein the organosilane and nonionic material are on the surface of the inner core.

4,013,574

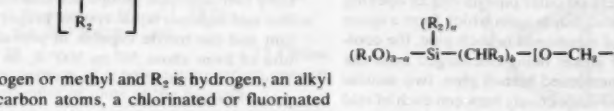
ORGANOSILANE-CONTAINING PRILL

John W. Leikhim, Cincinnati; Edward J. Maguire, Jr., Forest Park; David C. Heckert, Oxford, and David M. Watt, Jr., Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 22, 1975, Ser. No. 571,709
Int. Cl.² C11D *1/00*
U.S. Cl. 252—89 R 20 Claims

1. A prill containing an organosilane compound which consists essentially of:

a. an organosilane having the formula



or is a siloxane oligmer thereof wherein R_1 is an alkyl group containing 1 to 4 carbon atoms,

$(CH_3)_3Si$ or Z $(CH_xH_{2x})_m$

where x is 2 to 4, m is 1 to 20, and Z is hydrogen, and alkyl group containing 1 to 18 carbons or an acyl group containing 1 to 4 carbon atoms; R_2 is an alkyl group contaning 1 to 18 carbon atoms; a is 0 to 2; R_3 is hydrogen or an alkyl group containing 1 to 18 carbon atoms; b is 1 to 3; c is 0 or 1; R_4 is an alkyl, aryl or arylalkyl group containing 1 to 12 carbon atoms, a carboxy-substituted alkyl group containing 1 to 4 carbon atoms,

$$(C_xH_{2x}O)_mZ$$

where x, m and Z are as defined above, or oxygen provided only one R_4 is oxygen and further provided that there is no X^- when R_4 is oxygen; R_5 is an alkyl, aryl or arylalkyl group containing 1 to 22 carbon atoms; X is bromide or chloride; and Y is nitrogen, sulfur or phosphorus; and

b. a water-soluble or water-dispersible, normally solid nonionic material which melts or liquifies between the temperatures of 35° and 95° C and is compatible with said organosilane compound in a weight ratio of organosilane to nonionic material of from 4:1 to 1:50.

4,013,575

DRY CLEANING WITH PERACIDS

Harry Marcus Castrantas, Newtown, Pa., and John T. Gresham, Skillman, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Nov. 28, 1975, Ser. No. 636,078
Int. Cl.² C11D 7/54
U.S. Cl. 252—104 **19 Claims**

1. An improved dry cleaning emulsion formulation consisting essentially of:

a. about 0.1 to about 30% by weight water;

b. about 0.1 to about 5.0% by weight of a surfactant which is capable of emulsifying water in a dry cleaning solvent or a dry cleaning solvent in water and which does not react with a peracid;

c. a sufficient amount of an emulsion soluble peracid to provide about 0.001 to 0.15% by weight active oxygen;

d. a sufficient amount of alkali to maintain the pH value of the emulsion from 2.0 to 9.0; and

e. the remainder being at least 69% by weight dry cleaning solvent.

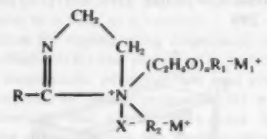
4,013,576

CONTACT LENS TREATING COMPOSITION

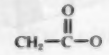
Samuel Loshaek, Chicago, Ill., assignor to Wesley-Jessen Inc., Chicago, Ill.

Filed Nov. 21, 1973, Ser. No. 417,913
Int. Cl.² C11D 1/84, 3/48
U.S. Cl. 252—106 **7 Claims**

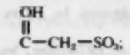
1. A substantially isotonic contact lens treating solution consisting essentially of water, a bacteriocide that is nonirritating to the human eye, and a quaternary ammonium amphoteric surfactant selected from:



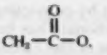
in which R is a C_6-C_{18} fatty acid radical; R_2 is



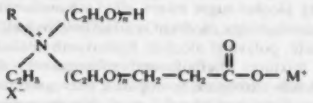
or



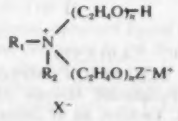
M and M_1 are alkali metals; X is OH or a sulfate or sulfonate acid group of an anionic surface active agent; R_1 is H or



provided, however, when R_1 is hydrogen, M_1 is absent; and n is an integer from 1 to 40;



in which R is a hydrophobe C_6-C_{19} hydrocarbon radical; M is an alkali metal; X is a lower alkyl sulfate group or halide; and n is an integer from 1 to 40; and



in which R_1 is a C_8-C_{18} fatty acid radical, R_2 is a C_1-C_4 alkyl; Z is a sulfate or sulfonate group; M is an alkali metal radical; and X is a lower alkyl sulfate group or halide, said solution having a pH of about 7; said amphoteric surfactant being present in an effective amount but no more than about 1% by weight, and said bacteriocide being present in an amount between approximately 0.01% and 0.015% by weight.

4,013,577

HEAVY DUTY DRY BIODEGRADABLE DETERGENT COMPOSITION

Harold Eugene Wixon, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 14, 1972, Ser. No. 244,259
Int. Cl.² C11D 1/24, 3/08, 3/10
U.S. Cl. 252—109 **19 Claims**

1. A heavy duty dry detergent composition devoid of phosphate and nitrogeneous builders and which consists essentially of about 8 to about 30% of water-soluble anionic synthetic detergent salt of the formula $RO(C_2H_4O)_nSO_3M$, wherein R is a substantially straight chain fatty alkyl of from 10 to 20 carbon atoms, n is a number from 2 to 6, n being from about one-fifth to one-third the number of carbon atoms in R, and M is a salt-forming cation; about 30 to 70% by weight of a water-soluble builder salt selected from the group consisting of silicates, carbonates, oxydiacetates citrates and mixtures thereof; about 0 to 5% of an alkali metal soap; and about 10 to 50% by weight of a filler selected from the group consisting of sodium chloride, sodium sulfate and sodium bisulfate.

4,013,578

DETERGENT INGREDIENT

Terence Frederick Child, and James Francis Davies, both of Wirral, England, assignors to Lever Brothers Company, New York, N.Y.

Filed Aug. 14, 1974, Ser. No. 497,424

Claims priority, application United Kingdom, Aug. 15, 1973, 38645/73

Int. Cl.² C11D 3/12

U.S. Cl. 252—140 11 Claims

1. A process for treating finely divided calcium carbonate having a surface area of from about 5 to about 100 square meters per gram (m^2/g) by contacting the calcium carbonate before said calcium carbonate has been dried with about 1% to about 50% by weight of the calcium carbonate of a water soluble dispersing aid in aqueous dispersion at a concentration of not more than 50% by weight of calcium carbonate, said dispersing aid being selected from the group consisting of alkali metal alkyl benzene sulphonates, alkali metal alkyl sulphates, alkali metal ethoxylated alcohol sulphates, alkali metal olefin sulphonates, ethoxylated alcohols, sugar esters, polyhydroxy alcohol sugar esters, alkyl ethanolamides, ethoxylated ethanolamides, sodium carboxymethylcellulose, sodium alginate, polyvinyl alcohol, hydroxyethylcellulose, gelatine, and mixtures thereof, and subsequently drying the treated calcium carbonate to impart a decreased tendency to aggregation of the treated calcium carbonate particles.

4,013,579

ACIDIC CLEANING COMPOSITION

Yumio Nakasone, Funabashi; Miwako Abe, Ichikawa, and Hiroshi Mizutani, Yachiyo, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 31, 1974, Ser. No. 475,584

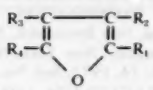
Claims priority, application Japan, June 6, 1973, 48-63669

Int. Cl.² C11D 7/50

U.S. Cl. 252—143 10 Claims

1. A method of cleaning an object having adherent soil or stain thereon, which comprises applying to said object a liquid acidic cleaning composition, consisting essentially of

a. from 0.1 to 20 weight percent of at least one furancarboxylic acid compound having the formula



wherein R_1, R_2, R_3 and R_4, which can be the same or different, are hydrogen or —COOH, with the proviso that at least one of R_1, R_2, R_3 and R_4 is —COOH,

b. up to 10 weight percent of anionic, cationic, nonionic or ampholytic water-soluble surfactants effective to promote penetration of the cleaning composition for dispersing and emulsifying dislodged soil,

c. up to 10 weight percent of mono- or di-ethylene glycol mono alkyl (C_1 to C_4) ethers,

d. up to 10 weight percent of hydrotroping agent sufficient to dissolve (a), and

e. the balance is water and then rubbing said object to remove soil therefrom.

4,013,580

METHOD OF PREVENTING FORMATION OF POPCORN CHLOROPRENE POLYMER

Takao Hayashi, and Akihiko Shimizu, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan

Continuation-in-part of Ser. No. 386,851, Aug. 8, 1973, abandoned. This application May 21, 1975, Ser. No. 579,684

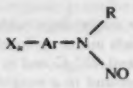
Claims priority, application Japan, Aug. 9, 1972, 47-79186

Int. Cl.² C07C 17/42, 21/21; 87/60

U.S. Cl. 252—182 5 Claims

1. A method for preventing the formation of popcorn chloroprene polymer, which comprises:

adding an N-nitroso aniline compound having the formula



wherein Ar is a phenyl group; R represents a C_{1-8} alkyl or a carboxymethyl group and when R is C_{1-8} alkyl, X is hydroxyl and n is 1 or 2; and when R is carboxymethyl group, X is halogen or hydroxyl and n is 0,1 or 2, to chloroprene monomer, wherein said N-nitrosoaniline is easily removed from said chloroprene monomer by washing the same with an aqueous alkaline solution.

4,013,581

BLEACH TABLET COMPOSITION

Arthur Elmer Huber, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed July 10, 1975, Ser. No. 594,910

Int. Cl.² C01B 13/00; C09K 3/00

U.S. Cl. 252—186 10 Claims

1. A bleach composition in tablet form, consisting essentially of:

a. a mixture of a solid peroxygen bleach and sodium sulfate, at a weight ratio of sodium sulfate:peroxygen bleach in the range from about 3:1 to about 1:3; and

b. a mixture of microfine, free-flowing starch and microcrystalline cellulose, at a weight ratio of starch:cellulose in the range from about 5:28 to about 28:5, the weight ratio of the mixture of starch and cellulose to the mixture of peroxygen bleach and sodium sulfate being in the range from about 1:5 to about 1:2.

4,013,582

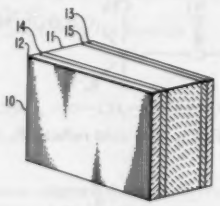
LIQUID CRYSTAL COMPOUNDS AND ELECTRO-OPTIC DEVICES INCORPORATING THEM

Dragan Milan Gavrilovic, Cranbury, N.J., assignor to RCA Corporation, New York, N.Y.

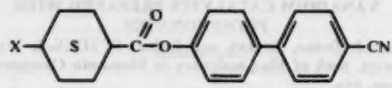
Filed June 17, 1976, Ser. No. 696,904

Int. Cl.² C09K 3/34; G02F 1/13; C07C 121/64, 69/96

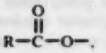
U.S. Cl. 252—299 9 Claims



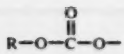
3. A liquid crystal compound having the formula



wherein X is a member selected from the group consisting of RO—,



and



groups wherein R is an alkyl group of 1–10 carbon atoms.

4,013,583

PROCESSES FOR REGENERATING DISPERSIONS OF LIGAND STABILIZED, PALLADIUM AND PLATINUM (II) HALIDE-COMPLEXES USED IN CARBONYLATION AND HYDROFORMYLATION CATALYSTS

John F. Knifton, Poughquag, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed May 27, 1975, Ser. No. 581,395

Int. Cl.² B01J *31/40, 27/32;* **C07C** *51/00;* **C11C** *3/02*

U.S. Cl. 252—415 **3 Claims**

1. A process for the regeneration of dispersions of spent ligand-stabilized palladium(II) or platinum(II) halide catalysts in quaternary ammonium, phosphonium and arsonium salts of trihalostannate(II) and trihalogermanate(II), the spent catalysts being obtained from the carbonylation or hydroformylation of olefins, said ligand-stabilized groups being selected from the group consisting of $P(C_6H_5)_3$, $P(p\text{-}CH_3.C_6H_4)_3$, $P(C_6H_5)_2CH_2Cl$, $As(C_6H_5)_3$, $S(C_6H_5)_2$, $P(OC_6H_5)_3$, $P(n\text{-}C_4H_9)_3$, $(C_6H_5)_2AsCH_2CH_2As(C_6H_5)_2$, the process consisting essentially of:

a. contacting each part by weight of said dispersions to be regenerated with from 0.1 part by weight to 10^3 part by weight of mineral acid consisting of mixtures of hydrochloric acid, having a specific gravity of from 1.00 to 1.20 at 20° C, and nitric acid having a specific gravity of from 1.00 to 1.51 at 20° C, said acids being in volume ratios ranging from 0.01 to 100 parts by volume of hydrochloric acid for each part by volume of nitric acid;

b. evaporating said mixture of solid catalyst plus acid to dryness at 50°–110° C;

c. adding additional stabilizing ligand in the ratio of 1–10 mole of ligand per mile of palladium or platinum present in said spent dispersions,

d. refluxing the mixture from (c) with excess organic solvent mixture, removing excess solvent and drying the dispersion to a solid in a vacuum.

2. A process for regenerating dispersions of spent ligand-stabilized palladium(II) and platinum(II) halide complexes in quaternary ammonium, phosphonium and arsonium salts of trihalostannate(II) or trihalogermanate(II) by ligand-stabilized palladium(II) and platinum(II), said ligand-stabilized catalyst being obtained from the carbonylation or hydroformylation of olefins, said ligand-stabilized dispersion to be regenerated selected from the group consisting of:

$[(C_2H_5)_4N][SnCl_3]—PdCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PdCl_2[P(p\text{-}CH_3.C_6H_4)_3]_2$

$[ClCH_2(C_6H_5)_3P][SnCl_3]—PdCl_2[P(C_6H_5)_3]_2$

$[(n\text{-}C_4H_9)_4N][SnCl_3]—PdCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][GeCl_3]—PdCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PdCl_2[P(p\text{-}CH_3O.C_6H_4)_3]_2$ and

$[(C_7H_{15})_4N][GeCl_3]—PdCl_2[As(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2[As(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2[S(C_6H_5)_2]_2$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2[P(OC_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2[P(n\text{-}C_4H_9)_3]_2$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2[(C_6H_5)_2AsCH_2CH_2As(C_6H_5)_2]$

$[(C_2H_5)_4N][SnCl_3]—PtCl_2$[O-Phenanthroline] and

$[(C_2H_5)_4N][SnCl_3]—PtCl_2$,

$[(C_6H_5)_4As][SnCl_3]—PdCl_2[P(C_6H_5)_3]_2$

by the process consisting essentially of:

a. contacting each part by weight of said dispersions to be regenerated with from 0.1 part by weight to 10^3 part by weight of mineral acid concisting of mixtures of hydrochloric acid, having a specific gravity of from 1.00 to 1.20 at 20° C, and nitric acid having a specific gravity of from 1.00 to 1.51 at 20° C, said acids being in volume ratios ranging from 0.01 to 100 parts by volume of hydrochloric acid for each part by volume of nitric acid;

b. evaporating said mixture of solid catalyst plus acid to dryness at 50°–110° C;

c. adding additional stabilized ligand corresponding to the original ligand contained in the dispersion of spent catalyst prior to the catalyst's use in the aforementioned hydroformylation, hydrogenation and carbonylation reactions, said ligand's ratio of 1–10 moles of ligand per mole of palladium or platinum present in the spent dispersion;

d. refluxing the mixture from (c) with excess organic solvent mixture, removing excess solvent and drying the dispersion to a solid in a vacuum.

4,013,584

PROCESSES FOR REGENERATING DISPERSIONS OF LIGAND-STABILIZED, PALLADIUM AND PLATINUM (II) HALIDE COMPLEXES USED IN CARBONYLATION AND HYDROFORMYLATION CATALYSIS

John F. Knifton, Poughquag, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed May 27, 1975, Ser. No. 581,320

Int. Cl.² B01J *31/40, 27/32;* **C07C** *51/00;* **C11C** *3/02*

U.S. Cl. 252—415 **5 Claims**

1. A process for the regeneration of dispersions of spent ligand-stabilized palladium(II) or platinum(II) halide catalysts in quaternary ammonium, phosphonium and arsonium salts of trihalostannate(II) and trihalogermanate(II), the spent catalysts being obtained from the carbonylation or hydroformylation of olefins, said ligand-stabilized groups being selected from the group consisting of $P(C_6H_5)_3$, $P(p\text{-}CH_3.C_6H_4)_3$, $P(C_6H_5)_2CH_2Cl$, $As(C_6H_5)_3$, $S(C_6H_5)_2$, $P(OC_6H_5)_3$, $P(n\text{-}C_4H_9)_3$, $(C_6H_5)_2AsCH_2CH_2As(C_6H_5)_2$, the process consisting essentially of:

a. contacting the spent dispersions of catalyst with chlorine gas at 25° to 200° C for 1–48 hours at a flow rate between 1 and 500 cc per minute;

b. adding additional ligand corresponding to the original ligand contained in the dispersion of spent catalyst, prior to the catalyst's use in carbonylation, hydroformylation or hydrogenation reaction, the ligand being added at rates

of 1–10 moles of ligand per mol of palladium or platinum present in the spent dispersion to be regenerated;

c. adding inert solvent to the chlorinated spent catalyst;

d. refluxing the catalyst-inert solvent mixture;

e. removing the excess inert solvent mixture, and

f. drying the regenerated catalyst.

4. A process for regenerating dispersions of spent ligand-stablized palladium(II) and platinum(II) halide catalysts in quaternary ammonium, phosphonium and arsonium salts of trihalostannate(II) or trihalogermanate(II), said spent catalysts being obtained through carbonylation or hydroformylation of olefins, by the process consisting essentially of:

a. passing chlorine over spent catalysts selected from the group consisting of:

$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(p\text{-}CH_3.C_6H_4)_3]_2$

$[ClCH_2(C_6H_5)_2P][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$

$[(n\text{-}C_4H_9)_4N][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$

$[(C_6H_5)_4As][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][GeCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(p\text{-}CH_2O.C_6H_4)_3]_2$

$](C_7H_{15})_4N][GeCl_3]$-$PdCl_2[As(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2[P(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2[As(C_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2[S(C_6H_5)_2]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl[]P(OC_6H_5)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2[P(n\text{-}C_4H_9)_3]_2$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2[(C_6H_5)_2AsCH_2CH_2As(C_6H_5)_2]$

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2$[O-Phenanthroline]and

$[(C_2H_5)_4N][SnCl_3]$-$PtCl_2[(C_6H_5)_3]_2$

at 25°–200° C for 1–48 hours at a flow rate between about 1 and 500 cc per minute;

b. adding additional stabilizing ligand in the ratio of 1–10 mole of ligand per mole of palladium or platinum present in said spent dispersions;

c. refluxing the mixture from b) in excess organic solvent mixture, removing excess solvent and drying the solid dispersion in a vacuum.

4,013,585

NITROHUMIC ACID-CONTAINING ADSORBENTS AND PROCESS FOR PRODUCING SAME

Kazuki Terajima; Shigeru Tomita; Yoshindo Matsuda, all of Tokyo, and Keiji Abe, Omiya, all of Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed July 18, 1974, Ser. No. 489,505

Claims priority, application Japan, July 19, 1973, 48-81928

The portion of the term of this patent subsequent to Aug. 19, 1992, has been disclaimed.

Int. Cl.² C02B 1/14, 1/52

U.S. Cl. 252—427 **19 Claims**

1. An adsorbent which comprises a mixture of at least one protein and a compound selected from the group consisting of nitrohumic acid and a water-insoluble salt thereof, wherein said protein is selected from the group consisting of petroleum proteins, yeasts, animal leather, animal hair and mixtures thereof and is present in an amount of about 5–50 parts by weight per 100 parts by weight of said nitrohumic acid.

4,013,586

VANADIUM CATALYSTS PREPARED WITH PHOSPHONATES

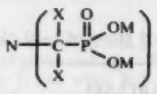
Thomas J. Dolan, Arnold, and Robert S. Mitchell, Webster Groves, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed July 24, 1975, Ser. No. 598,615

Int. Cl.² B01J 27/18, 37/00

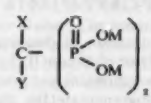
U.S. Cl. 252—437 **11 Claims**

1. In a process for preparing a phosphorus-vanadium-oxygen catalyst wherein a pentavalent vanadium compound is contacted with a phosphorus compound under conditions to provide a substantial amount of tetravalent vanadium and to for a phosphorus-vanadium-oxygen precursor, the improvement which comprises contacting the pentavalent vanadium compound with a phosphonate compound selected from the group consisting of:



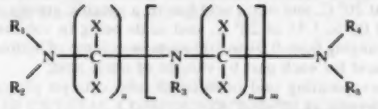
FORMULA I

where each X is selected from the group consisting of hydrogen and lower alkyls containing 1 to 4 carbon atoms and M is a member selected from the group consisting of hydrogen and cations;



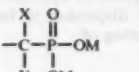
FORMULA II

wherein X is a member selected from the group consisting of hydrogen and lower alkyl (1–4 carbon atoms) and Y is a member selected from the group consisting of hydrogen, hydroxyl and lower alkyl (1–4 carbon atoms), and M is a member selected from the group consisting of hydrogen and cations; and

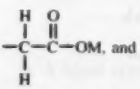


FORMULA III

wherein each X is selected from the group consisting of hydrogen and lower alkyls containing 1 to 4 carbon atoms; n is either 2 or 3; m is 0 to 12; R_3 is selected from the group consisting of hydrogen, lower alkyl containing 1 to 4 carbon atoms and $-CH_2PO_2M$ group; R_1, R_2, R_4 and R_5 are from the group of radicals



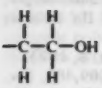
FORMULA IV



FORMULA V

-continued

FORMULA VI



with the proviso that at least two $-C(X)(X)PO_3M_2$ groups are present at all times and are either R_1 and R_2 or R_4 and R_5 and that the compound gives a positive result with the vanadium reducing test.

4,013,587

PROCESS FOR THE MANUFACTURE OF SPHERICAL ALUMINA-CONTAINING PARTICLES

Hermann Fischer, Evern; Hubert Schindler, Dollbergen; Winfried Kuhrt, Hannover-Kirchrode, and Guenter Weidenbach, Hannover, all of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Feb. 3, 1976, Ser. No. 654,923

Claims priority, application Germany, Feb. 4, 1975, 2504463; Oct. 16, 1975, 2546318

Int. Cl.² B01J *21/04, 21/12, 23/72, 23/86*

U.S. Cl. 252—448 **19 Claims**

1. A process for the preparation of alumina-containing particles, comprising the steps of:

a. mixing an aluminum oxide hydrosol containing a hydrate of alumina or activated alumina and an additive component of wood flour, starch, carbon black or carbon powder with a solution of a hydrolyzable base to form a mixture;

b. introducing said mixture in dispersed form into a water-immiscible liquid having a temperature of from about 60° to 100° C., whereby gel particles are formed;

c. aging said gel particles in said liquid at said temperature and subsequently in an aqueous ammonia solution;

d. recovering said aged particles; and

e. drying and calcining said recovered particles.

4,013,588

OXIDATION CATALYST FOR REMOVAL OF NITROGEN MONOXIDE IN EXHAUST GAS

Takaaki Tamura, Tokyo, Japan, assignor to Kogyo Kaihatus Kenkyusho (Industrial Research Institute), Tokyo, Japan

Filed May 6, 1974, Ser. No. 467,085

Claims priority, application Japan, May 12, 1973, 48-52826; May 12, 1973, 48-52827; May 12, 1973, 48-52828; May 12, 1973, 48-52829

Int. Cl.² B01J *29/00, 29/06*

U.S. Cl. 252—454 **5 Claims**

1. An oxidation catalyst for the removal of nitrogen monoxide in exhaust gas, said catalyst being obtained by a procedure comprising heating a naturally occurring inorganic material at a temperature of from 100° to 900° C, said naturally occurring inorganic material being a tuff consisting essentially of SiO_2, Al_2O_3 and H_2O, containing 1 to 10% by weight of total of an alkaline metal oxide and an alkaline earth metal oxide and having the X-ray diffraction pattern shown in Table I or Table II, said inorganic material having a mesh size of less than 50 mesh.

4,013,589

PROCESS FOR THE PREPARATION OF MATERIALS HAVING IMPROVED MECHANICAL PROPERTIES AND MATERIALS OBTAINED THEREBY

Franco Buonomo; Vittorio Fattore, and Bruno Notari, all of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed Oct. 31, 1974, Ser. No. 519,791

Claims priority, application Italy, Sept. 19, 1974, 27455/74

Int. Cl.² B01J *29/06*

U.S. Cl. 252—455 R **4 Claims**

1. The process of improving the mechanical and thermal properties of aluminum oxide adapted for use as a catalyst or catalytic carrier which comprises impregnating said aluminum oxide with a silicon compound containing hydrolyzable radicals selected from the group consisting of the tetraesters of silicic acid, the halogen containing esters of orthosilicic acid and the organic silicon salts, slowly heating said impregnated aluminum oxide to the boiling temperature of said silicon compound in an inert atmosphere so as to react the silicon compound with the aluminum oxide and to distill off reaction products and excess silicon compound, and then reacting the hydrolyzable radicals bound to the silicon compound on said aluminum oxide with water in a closed vessel so as to hydrolyze said hydrolyzable radicals and distilling off vapors from said vessel and condensing said vapors outside the vessel until only water is condensed.

4,013,590

PROCESS FOR PREPARING MATERIALS HAVING IMPROVED MECHANICAL AND THERMAL PROPERTIES AND MATERIALS OBTAINED THEREBY

Franco Buonomo; Vittorio Fattore, and Bruno Notari, all of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed Oct. 31, 1974, Ser. No. 519,792

Claims priority, application Italy, Oct. 31, 1973, 30787/73

Int. Cl.² B01J *29/06*

U.S. Cl. 252—455 R **9 Claims**

1. The process of improving the mechanical and thermal properties of aluminum oxide adapted for use as a catalyst or catalyst carrier which comprises impregnating said aluminum oxide with a silicon compound having the general formula:

in which X, Y, Z and W are selected from the group consisting of (—R), (—Cl), (—Br), (—SiH), (—COOR), (—SiH Cl), —[OSi(OR)]$_p$, OSi, (OR)$_3$, in which R is an alkyl, cycloalkyl, aromatic alkylaromatic or alkyl-cycloalkyl radical having from 1 to 30 carbon atoms; n, m and p are whole numbers from 1 to 3, by bringing said silicon compound or a solution thereof in a compatible organic solvent whose boiling point is lower than the boiling point of the silicon compound into contact with said aluminum oxide, drying said impregnated aluminum oxide at a temperature in the range of from the boiling point of the silicon compound to 500° C, and then subjecting said impregnated aluminum oxide to controlled oxidation.

4,013,591

COMPOSITE SUPERCONDUCTING MATERIALS

René Granger, Thorigne; Alain Labsley, Rennes, and Serge Rolland, Cesson-Sevigne, all of France, assignors to Brevatome, Paris, France

Filed Mar. 11, 1974, Ser. No. 449,749

Claims priority, application France, Mar. 13, 1973, 73.08962

Int. Cl.² H01B 1/06

U.S. Cl. 252—512 7 Claims

1. A composite superconducting material comprising in combination,

a monocrystalline matrix composed of a semiconductor substance exhibiting superconducting properties, and

microprecipitated dispersed within said matrix establishing zones, said microprecipitates constituting a metallic constituent of said semiconductor substance.

4,013,592

HIGH TEMPERATURE THERMISTOR COMPOSITION

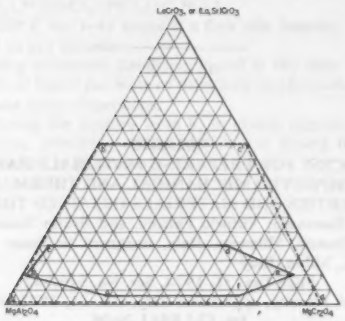
Tomizo Matsuoka; Yoshihiro Matsuo, both of Neyagawa, and Shigeru Hayakawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Feb. 17, 1976, Ser. No. 658,666

Claims priority, application Japan, Feb. 19, 1975, 50-21201

Int. Cl.² H01B 1/08

U.S. Cl. 252—521 4 Claims



3. A high temperature thermistor composition having the ternary system $A.MgAl_2O_4$—$B.MgCr_2O_4$—$C.LaCrO_3$, wherein said composition is defined by the area of FIG. 2 enclosed by following six composition points;

(a)	A=0.679	B=0.291	C=0.03
(b)	A=0.891	B=0.009	C=0.10
(c)	A=0.776	B=0.024	C=0.20
(d)	A=0.24	B=0.56	C=0.20
(e)	A=0.09	B=0.81	C=0.10
(f)	A=0.291	B=0.679	C=0.03.

4,013,593

FRAGRANCE COMPOSITIONS CONTAINING N-(2-FURFURYL)-PYRROLE

Gary W. Shaffer, Wayne; Irene Tornell, Woodcliff Lake, and Kenneth L. Purzycki, Lake Parsippany, all of N.J., assignors to Givaudan Corporation, Clifton, N.J.

Filed Nov. 10, 1975, Ser. No. 630,235

Int. Cl.² C11B 9/00

U.S. Cl. 252—522 13 Claims

1. A method for improving fragrance compositions which include constituents other than natural oils wherein the improvement comprises adding thereto an olfactorily effective amount of N-(2-furfuryl)-pyrrole to impart naturalness and lift.

4,013,594

POWDERED CLEANING COMPOSITION OF UREA-FORMALDEHYDE

Helmut Hermann Froehlich, and William Jacob Lautenberger, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Continuation-in-part of Ser. No. 394,263, Oct. 8, 1973, abandoned, which is a continuation of Ser. No. 209,402, Dec. 17, 1971, abandoned. This application Jan. 16, 1974, Ser. No. 433,707

Claims priority, application France, Dec. 15, 1972, 72.44806; Germany, Dec. 15, 1972, 2261587; Japan, Dec. 16, 1972, 47-125837; United Kingdom, Dec. 15, 1972, 58090/72

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C11D 1/38, 1/50, 3/26

U.S. Cl. 252—544 5 Claims

1. A powdered cleaning composition having a soil substantivity constant greater than 1.5 and consisting essentially of about 30 to 90% particulate polymeric ureaformaldehyde and about 10 to 70% fluid, the urea-formaldehyde having a particle size of about from 10 to 105 microns, an oil absorption value of no less than 90, fiber hardness and a bulk density of at least 0.2 g./cc., and the fluid consisting essentially of up to 100% water containing sufficient surfactant to give a surface tension of less than 40 dynes per centimeter and up to 100% of organic liquid selected from high boiling hydrocarbon solvents, tetrachloroethylene, methyl chloroform, 1,1,2-trichloro-1,2,2-trifluoroethane, an aliphatic alcohol containing from 1 to 4 carbon atoms, and mixtures of these.

4,013,595

NON-FLAMMABLE RUG CLEANING COMPOSITION

Carl Walter Podella, Kenosha, and Fred Jay Reichley, Racine, both of Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed May 23, 1975, Ser. No. 580,495

Int. Cl.² C11D 3/37, 3/20, 1/14

U.S. Cl. 252—545 13 Claims

1. In a rug cleaning composition of the type comprising:

a. from 2 to 20% by weight of a rug cleaning polymer;

b. from 0 to 5% by weight of a metal salt;

c. from 0.5 to 10% by weight of at least one surfactant from 50 to 95% by weight water, and

e. from 5 to 20% by weight hydrocarbon propellent;

the improvement which comprises reducing the flammability of said composition by incorporating at least 0.3% by weight lauryl alcohol and wherein said surfactant includes from 0.3 to 10% by weight of the composition of $CH_3(CH_2)_{10}CH_2OSO_3M$ is a positively charged cation.

4,013,596

ADHESIVE TETRAZOLE POLYMERS AND PROCESS OF MAKING THEREFOR

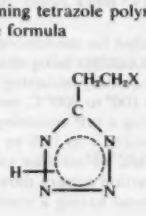
Fred J. Einberg, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 435,345, Jan. 21, 1974, Pat. No. 3,929,684. This application Mar. 7, 1975, Ser. No. 556,529

Int. Cl.² C08G 73/06; C06B 45/10

U.S. Cl. 260—2 R 6 Claims

1. Process for forming tetrazole polymers comprising adding substances of the formula



where X is a member selected from the group consisting of Br, Cl, and I to a medium where base is present in a molar equivalent amount to said 5-(2-haloethyl) tetrazole or slightly less than a molar equivalent amount and then heating said medium at 50°–100° C for a minimum of 5 days to form resulting tetrazole polymers whose inherent viscosity at 25° C is a number from about 0.03 – 0.36.

4,013,597

FAST COOLING STYRENE POLYMER FOAMS

Jose E. Granda, Aliquippa, Pa.; John J. Quinlan, Atco, N.J., and James J. Garland, Aliquippa, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed June 17, 1975, Ser. No. 587,582

Int. Cl.² C08J 9/22

U.S. Cl. 260—2.5 B **12 Claims**

1. Method of making foamable styrene polymer particles which yield fast cooling foamed moldings of large cross-section consisting of intimately mixing a dry blend of

a. styrene polymer particles containing 3 to 20 weight per cent of a blowing agent, and

b. 0.05 to 0.4 weight percent of a silicone surfactant selected from the siloxane-oxyalkylene copolymers having (1) at least one polysiloxane block which contains mers of the general formula R_2SiO where R is selected from the group consisting of alkyl having 1 to 4 carbon atoms and halogenated alkyl having 1 to 4 carbon atoms, and (2) at least one polyoxyalkylene block attached to said polysiloxane block, and terminated by acetoxy or alkyl ether groups, and containing mers of general formula $C_nH_{2n}O$, where n is 2, 3 or 4.

4,013,598

COMPOSITION AND METHOD FOR MAKING SEAMLESS FLOORING AND THE LIKE

Robert M. Evans, 2399 Edgerton Road, University Heights, and Joseph S. Fogel, 1365 Forest Hills Blvd., Cleveland Heights, both of Ohio 44118

Division of Ser. No. 270,620, July 11, 1972, Pat. No. 3,908,043. This application July 2, 1975, Ser. No. 592,542

Int. Cl.² 428 413, 423; C08K 5/01; C08L 1/14

U.S. Cl. 260—13 **13 Claims**

1. A polyurethane base coating composition capable of forming films of high abrasion and stain resistance comprising: (1) a solution in volatile organic solvent of an —NCO terminated prepolymer of a diisocyanate having unequal reactivity of the two isocyanate groups and a polyoxypropylene triol which has an equivalent weight of 180 to 400; said prepolymer having a free —NCO content of 5 to 10%, and (2) a polycaprolactone triol in amounts to react with most of said —NCO of said prepolymer, the ratio of the equivalents of free —NCO in said prepolymer to equivalents of —OH in the polycaprolactone cross-linking agent being greater than 1.75.

4,013,599

FIRE-RETARDANT COATING COMPOSITION COMPRISING ETHERIFIED AND NON-ETHERIFIED AMINO-FORMALDEHYDE RESIN

Richard Strauss, Wiesbaden; Arnold Giller, Weren, Taunusstein; Dieter Zacharowski, and Hans Wiener, both of Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 447,372, March 1, 1974, abandoned. This application July 5, 1974, Ser. No. 485,868

Claims priority, application Germany, Mar. 28, 1973, 2315416

Int. Cl.² C08L 3/02

U.S. Cl. 260—17.3 **13 Claims**

1. An aqueous fire-retardant coating composition capable of forming a foam layer and consisting of

I. an aqueous preparation comprising

a. a non-etherified amino-formaldehyde resin or its components or a mixture thereof

b. at least one ammonium phosphate,

c. a skeleton-forming component and

II. a solution of at least one further amino-formaldehyde resin being at least partially etherified with at least one alcohol having 1 to 12 C-atoms and dissolved in an organic solvent.

4,013,600

AQUEOUS COMPOSITIONS OF POLYIMIDES CONTAINING HETERO-POLYSACCHARIDE

Robert Cassat, Saint-Fons, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed May 16, 1975, Ser. No. 578,025

Claims priority, application France, May 20, 1974, 74.17451

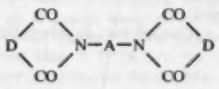
Int. Cl.² C08L 5/00

U.S. Cl. 260—17.4 ST **7 Claims**

1. A pseudoplastic aqueous suspension of a prepolymer powder prepared from:

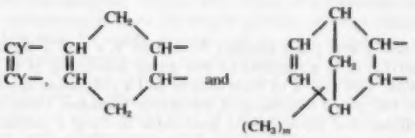
A. A imide group-containing compound chosen from the group consisting of:

a. a bis-imide of the formula:



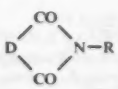
(I)

in which D represents a divalent radical which has the formula:



wherein Y represents H, CH_3 or Cl and m is equal to 0 or 1, and A represents a divalent organic radical containing 2 to 30 carbon atoms, and

b. a mixture of a bis-imide of formula (I) and a monoimide of the formula:



(II)

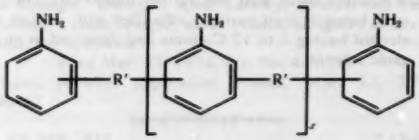
in which D is as defined above and R represents a hydrogen atom or a monovalent organic radical containing 1 to 20 carbon atoms, and

B. an amino compound chosen from the group consisting of:

a. one or more polyamines containing 2 to 5 primary or secondary amino groups, at least one of these groups being primary,

b. a mixture comprising one or more polyamines as defined under a) and one or more primary and/or secondary mono-amines and/or one or more secondary polyamines, and

c. a polyamine of the general formula:



in which x represents a number from 0.1 to 2 and R′ represents a divalent hydrocarbon radical with 1 to 8 carbon atoms, the suspension also comprising, based on the weight of the powder, 0.01 to 8% by weight of a heteropolysaccharide of very high molecular weight.

4,013,601

WATER-DILUTABLE POLYAMIDE RESINS AND WATER-DILUTABLE EPOXY RESIN COMPOSITIONS CONTAINING SAID POLYAMIDE RESINS

John A. Alford, Hanahan, S.C., assignor to Westvaco Corporation, New York, N.Y.

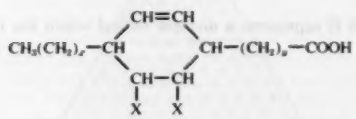
Filed July 31, 1975, Ser. No. 600,285

Int. Cl.² C08J *3/06*; **C08L** *63/10*, *77/06*

U.S. Cl. 260—18 PN **8 Claims**

1. A method of producing a water-dilutable reactive polyamide resin comprising;

a. reacting a C_{21}-cycloaliphatic dicarboxylic acid of the formula



wherein x and y are integers from 3 to 9, x and y together equal 12, X is a member of the group consisting of H and COOH, with one X of each moiety and a polyamine selected from the group consisting of diethylene triamine, triethylene tetramine and tetraethylene pentamine to form a polyamide resin, said C_{21}-cycloaliphatic dicarboxylic acid to polyamine being in a weight ratio from 1.5:1 to 3:1. and

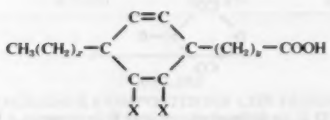
b. adding water up to about 55% to said polyamide resin.

4. A water-dilutable coating composition comprising;

a. 5–90% by weight of water as a solvent component,

b. 5–40% by weight of an epoxy resin,

c. 5–40% by weight of a polyamide resin produced by reacting a dibasic acid of the formula



wherein x and y are integers from 3 to 9, x and y together equal 12, X is a member of the group consisting of H and COOH with one X of each moiety and a polyamine selected from the group consisting of diethylene triamine, triethylene tetramine and tetraethylene pentamine, said dibasic acid to polyamine being in a weight ratio from 1.5:1 to 3:1,

d. said water being added to said polyamide resin to form a solution, and

e. said polyamide resin solution being mixed with said epoxy resin to form a stable emulsion.

4,013,602

ULTRAFINE NATURAL CALCIUM CARBONATES AS FILLERS IN VARNISHES AND PAINTS

Pierre Delfosse, Paris, France, and Alfred Bosshard, Oftringen, Switzerland, assignors to Pluss-Staufer AG, Oftringen, Switzerland

Continuation of Ser. No. 401,498, Sept. 27, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,963

Claims priority, application Germany, Oct. 9, 1972, 2251099; Feb. 26, 1973, 2309517

Int. Cl.² C08K *3/26*

U.S. Cl. 260—22 R **13 Claims**

1. A varnish or paint containing ultrafine natural calcium carbonate as a filler, the carbonate having an average statistical particle diameter of from 0.5 to 0.7 μ and a maximum diameter of from 3 to 4 μ.

4,013,603

COATING COMPOSITIONS FOR PROTECTING METALS

Michele Zavatti; Vittorio Baravalle, and Paolo Saracino, all of Milan, Italy, assignors to Labofina S.A., Brussels, Belgium

Filed Feb. 10, 1975, Ser. No. 548,406

Claims priority, application Italy, Feb. 20, 1974, 48563/74

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5 D **9 Claims**

1. In a sprayable composition used as a protective coating for metallic surfaces comprising a bituminous substance, a thixotropic agent and a filler, the improvement which comprises a composition having from about 5 to 20% by weight of a vinylic resin selected from the group consisting of homopolymer and copolymer of vinyl chloride, from about 10 to 30% by weight of a plasticizer for said vinylic resin, from 5 to 15% by weight of a bituminous substance, from 0.1 to 1.5% by weight of a thixotropic agent and from 20 to 65% by weight of a filler.

4,013,604

ETHYLENE-VINYL ESTER-ALKYL VINYL TERPOLYMER EMULSIONS

Glenn E. Teer; Jerry G. Higgins, and George D. Warren, all of Big Spring, Tex., assignors to Cosden Technology, Inc., Big Spring, Tex.

Filed Feb. 18, 1975, Ser. No. 550,374

Int. Cl.² C08L *31/04*

U.S. Cl. 260—29.6 RB **20 Claims**

1. A process for producing stable polymer emulsions of polymer particles comprising mixtures of polyethylene and terpolymers of ethylene, a vinyl monomer, selected from the group consisting of vinyl ester monomers of straight and branched chain carboxylic acids and straight and branched chain vinyl alkyl ether monomers, and an alkyl vinyl monomer having molecular weights in the range of from about 7,000 to 40,000 and particle sizes in the range of from about 200 to 1,000 angstroms which includes contacting ethylene, a vinyl monomer, and an alkyl vinyl monomer having from about 3 to about 24 carbon atoms, in an aqueous reaction medium having a pH of about 8.5 to 14.0 at a temperature in the range of from about 60° to 150° C and a pressure in the range of from about 1,400 to 20,000 psi in the presence of a water soluble persulfate initiator and an effective amount of an emulsifier selected from nonionic and anionic emulsifiers and mixtures thereof, wherein said vinyl monomer is present in an amount equal to about 0.5 to 20% by weight based on said aqueous reaction medium and wherein said alkyl vinyl monomer is present in an amount equal to about 0.1 to 10% by weight based on said aqueous reaction medium, to form said emulsion.

4,013,605

PHENOLIC RESINS FROM ALKYL SUBSTITUTED DIMETHYLOLPHENOLS

Kurt Hültzsch, Wiesbaden-Biebrich; Wolfgang Hesse, Wiesbaden, and Hans-Dieter Mummenthey, Ingelheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Dec. 8, 1970, Ser. No. 96,283
Int. Cl.² C08L *61/06, 61/08, 61/12*
U.S. Cl. 260—29.3 13 Claims

1. A process for the preparation of a flexible phenolic resin which comprises randomly and substantially alternately cocondensing A) a dimethylol derivative of a mononuclear monohydric alkylphenol, being substituted by one or two alkyl groups having from 1 to 20 carbon atoms, with B) a methylol derivative of a polyfunctional mono- to trihydric, mono- to trinuclear phenol having at least 3 functional groups in ortho- and para-position in which derivative at least half of the reactive hydrogen atoms in the polyfunctional phenol are substituted by methylol groups and wherein the ratio of the methylol groups of the derivative of the polyfunctional phenol compound B) in said resin per mol of the dimethylolalkyl phenol compound A) in said resin is from 1.4:1 to 6:1

4,013,606

PROCESS FOR PREPARING WATER SOLUBLE IONIC POLYMERS

Edward G. Ballweber, Glenwood, and Kenneth G. Phillips, River Forest, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation of Ser. No. 385,960, Aug. 6, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 545,839
The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.
Int. Cl.² C08L *61/20*
U.S. Cl. 260—29.4 UA 10 Claims

1. A process of preparing a dispersion of a water soluble cationic power polymer which comprises diluting with water a water-in-oil emulsion of a water soluble acrylamide polymer containing 20% by weight to 50% by weight of said acrylamide polymer, adding to said diluted emulsion a surfactant and a premix of formaldehyde and a secondary amine selected from the group consisting of dimethylamine, methylethylamine, dibutylamine, methylamylamine, methylaminoethanol, diethanolamine, morpholine and piperidine, in which the ratio of formaldehyde to said secondary amine is within the range of 10:1 to 1:10, the dilution and resultant concentration of polymer being such that the concentration of resultant cationic polymer is 1 to 10% by weight and the formation of said cationic polymer occurs in not more than 20 minutes, the weight ratio of said premix to said acrylamide polymer being within the range of 1:2 to 2:1 and the resultant cationic polymer having a cationicity of at least 60%.

4,013,607

SELF-STRIPPING COATING COMPOSITION

Sean G. Dwyer, Racine, and Daryl J. Hackbarth, Kenosha, both of Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed June 19, 1974, Ser. No. 480,981
Int. Cl.² C08L *33/02*
U.S. Cl. 260—29.6 H 20 Claims

1. In a stable coating composition adapted to simultaneously disperse a previously deposited dried coating composition and replace the dried composition with a fresh coating comprising: 50–96% water, 0–10% plasticizer, 0–5% leveling agent, 0–10% organic solvent, 0–5% surfactant, 0–15% wax, 0–10% film-modifying polymer and 3–18% polymeric coating agent; with the proviso that the total non-volatiles of the composition is in the range of from 4–20% and the combined non-volatiles of the leveling agent, solvent, plasticizer, surfactant, wax and film-modifying polymer are equal to or greater than 9% and less than 200% of the non-volatiles of the polymeric coating agent; the improvement which comprises using as the polymeric coating agent a solution of an alkali-soluble resin having a weight average molecular weight from about 500 to 30,000 and an acid number from about 120 to 550, said resin being an addition resin formed from (a) at least 1 ethylenically unsaturated ligand-free monomer is selected from the group consisting of vinyl toluene, methyl methacrylate, butyl methacrylate, acrylonitrile, vinyl acetate, styrene, α-methyl styrene, butyl acrylate, ethyl acrylate, 2-ethylhexylacrylate and mixtures thereof and (b) at least 1 ethylenically unsaturated monomer having at least 1 carboxyl group is selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, isocrotonic acid, maleic acid, fumaric acid and itaconic acid, wherein said resins contain from about 40–75% by weight of monomer (a) and from 60–25% by weight monomer (b), wherein the weight ratio of film-modifying polymer to polymeric coating agent is less than 0.57:1, adding aqueous ammonia to said composition in an amount sufficient to provide a pH of no less than 9.0, and said composition being substantially free of complex salts of cross-linking metals.

4,013,608

METHOD OF PRODUCING POLYMER SOLUTIONS OF POLYMERS OR COPOLYMERS OF VINYL CHLORIDE SERIES

Fumiya Nagoshi, Kobe; Hideyuki Arakawa, Akashi; Hayashi Uchino, Kobe; Mitsuru Echigoya, Kobe, and Masaki Matsuo, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 3, 1975, Ser. No. 554,413
Claims priority, application Japan, Mar. 5, 1974, 49-26000
Int. Cl.² C08K *5/20*; C08L *27/06, 27/08, 32/20*
U.S. Cl. 260—32.6 N 15 Claims

1. A method of producing solutions of polymers or copolymers of vinyl chloride series, comprising the steps of polymerizing in at least one step in a solvent mixture consisting essentially of 30 to 55 weight percent water, remainder N,N-dimethyl formamide, 100 parts by weight of a monomer mixture comprising at least 50 weight percent of vinyl chloride and less than 50 weight percent one or more monomers copolymerizable therewith, in the presence of 0.5 to 5.0 parts by weight of a surface active agent of a salt of monomeric compound having a sulphonic acid group selected from the group consisting of alkali metal salts of vinyl sulphonic acid, methacrylic acid sulphopropyl ester, methallyl sulphonic acid and styrene sulphonic acid and using an initiator for radical polymerization, and at a temperature of between 20° to 60° C, and after treating the resulting emulsion by at least distilling water and unreacted monomers from the resulting emulsion, and wherein said monomer mixture is 10 to 40 weight percent of the total weight of said solvent mixture and said monomer mixture.

4,013,609

RESINOUS COMPOSITION

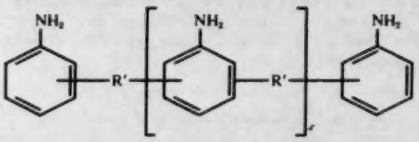
Kurt Hultzsch, Wiesbaden-Biebrich, Germany, and Helmut Fritze, Vienna, Austria, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Division of Ser. No. 345,116, March 26, 1973. This application Mar. 18, 1975, Ser. No. 559,441
Claims priority, application Germany, Mar. 29, 1972, 2215268; May 25, 1972, 2225351
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C08F *8/44, 222/02*
U.S. Cl. 260—33.6 UA 7 Claims

1. A resinous composition containing as an essential ingredient a binder comprising a product obtained by

I. reacting in a first stage a solution of

1. a copolymer containing a radical selected from the group consisting of (a) anhydride groups of vicinal



in which x represents a number from 0.1 to 2 and R′ represents a divalent hydrocarbon radical with 1 to 8 carbon atoms, the suspension also comprising, based on the weight of the powder, 0.01 to 8% by weight of a heteropolysaccharide of very high molecular weight.

4,013,601

WATER-DILUTABLE POLYAMIDE RESINS AND WATER-DILUTABLE EPOXY RESIN COMPOSITIONS CONTAINING SAID POLYAMIDE RESINS

John A. Alford, Hanahan, S.C., assignor to Westvaco Corporation, New York, N.Y.

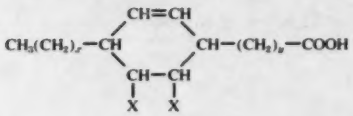
Filed July 31, 1975, Ser. No. 600,285

Int. Cl.² C08J *3/06*; **C08L** *63/10*, *77/06*

U.S. Cl. 260—18 PN **8 Claims**

1. A method of producing a water-dilutable reactive polyamide resin comprising;

a. reacting a C_{21}-cycloaliphatic dicarboxylic acid of the formula



wherein x and y are integers from 3 to 9, x and y together equal 12, X is a member of the group consisting of H and COOH, with one X of each moiety and a polyamine selected from the group consisting of diethylene triamine, triethylene tetramine and tetraethylene pentamine to form a polyamide resin, said C_{21}-cycloaliphatic dicarboxylic acid to polyamine being in a weight ratio from 1.5:1 to 3:1. and

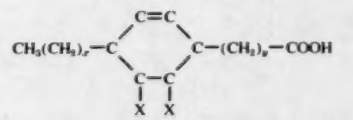
b. adding water up to about 55% to said polyamide resin.

4. A water-dilutable coating composition comprising;

a. 5–90% by weight of water as a solvent component,

b. 5–40% by weight of an epoxy resin,

c. 5–40% by weight of a polyamide resin produced by reacting a dibasic acid of the formula



wherein x and y are integers from 3 to 9, x and y together equal 12, X is a member of the group consisting of H and COOH with one X of each moiety and a polyamine selected from the group consisting of diethylene triamine, triethylene tetramine and tetraethylene pentamine, said dibasic acid to polyamine being in a weight ratio from 1.5:1 to 3:1,

d. said water being added to said polyamide resin to form a solution, and

e. said polyamide resin solution being mixed with said epoxy resin to form a stable emulsion.

4,013,602

ULTRAFINE NATURAL CALCIUM CARBONATES AS FILLERS IN VARNISHES AND PAINTS

Pierre Delfosse, Paris, France, and Alfred Bosshard, Oftringen, Switzerland, assignors to Pluss-Staufer AG, Oftringen, Switzerland

Continuation of Ser. No. 401,498, Sept. 27, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,963

Claims priority, application Germany, Oct. 9, 1972, 2251099; Feb. 26, 1973, 2309517

Int. Cl.² C08K *3/26*

U.S. Cl. 260—22 R **13 Claims**

1. A varnish or paint containing ultrafine natural calcium carbonate as a filler, the carbonate having an average statistical particle diameter of from 0.5 to 0.7 μ and a maximum diameter of from 3 to 4 μ.

4,013,603

COATING COMPOSITIONS FOR PROTECTING METALS

Michele Zavatti; Vittorio Baravalle, and Paolo Saracino, all of Milan, Italy, assignors to Labofina S.A., Brussels, Belgium

Filed Feb. 10, 1975, Ser. No. 548,406

Claims priority, application Italy, Feb. 20, 1974, 48563/74

Int. Cl.² C08L *91/00*

U.S. Cl. 260—28.5 D **9 Claims**

1. In a sprayable composition used as a protective coating for metallic surfaces comprising a bituminous substance, a thixotropic agent and a filler, the improvement which comprises a composition having from about 5 to 20% by weight of a vinylic resin selected from the group consisting of homopolymer and copolymer of vinyl chloride, from about 10 to 30% by weight of a plasticizer for said vinylic resin, from 5 to 15% by weight of a bituminous substance, from 0.1 to 1.5% by weight of a thixotropic agent and from 20 to 65% by weight of a filler.

4,013,604

ETHYLENE-VINYL ESTER-ALKYL VINYL TERPOLYMER EMULSIONS

Glenn E. Teer; Jerry G. Higgins, and George D. Warren, all of Big Spring, Tex., assignors to Cosden Technology, Inc., Big Spring, Tex.

Filed Feb. 18, 1975, Ser. No. 550,374

Int. Cl.² C08L *31/04*

U.S. Cl. 260—29.6 RB **20 Claims**

1. A process for producing stable polymer emulsions of polymer particles comprising mixtures of polyethylene and terpolymers of ethylene, a vinyl monomer, selected from the group consisting of vinyl ester monomers of straight and branched chain carboxylic acids and straight and branched chain vinyl alkyl ether monomers, and an alkyl vinyl monomer having molecular weights in the range of from about 7,000 to 40,000 and particle sizes in the range of from about 200 to 1,000 angstroms which includes contacting ethylene, a vinyl monomer, and an alkyl vinyl monomer having from about 3 to about 24 carbon atoms, in an aqueous reaction medium having a pH of about 8.5 to 14.0 at a temperature in the range of from about 60° to 150° C and a pressure in the range of from about 1,400 to 20,000 psi in the presence of a water soluble persulfate initiator and an effective amount of an emulsifier selected from nonionic and anionic emulsifiers and mixtures thereof, wherein said vinyl monomer is present in an amount equal to about 0.5 to 20% by weight based on said aqueous reaction medium and wherein said alkyl vinyl monomer is present in an amount equal to about 0.1 to 10% by weight based on said aqueous reaction medium, to form said emulsion.

4,013,605

PHENOLIC RESINS FROM ALKYL SUBSTITUTED DIMETHYLOLPHENOLS

Kurt Hültzsch, Wiesbaden-Biebrich; Wolfgang Hesse, Wiesbaden, and Hans-Dieter Mummenthey, Ingelheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Dec. 8, 1970, Ser. No. 96,283

Int. Cl.² C08L *61/06, 61/08, 61/12*

U.S. Cl. 260—29.3 **13 Claims**

1. A process for the preparation of a flexible phenolic resin which comprises randomly and substantially alternately cocondensing A) a dimethylol derivative of a mononuclear monohydric alkylphenol, being substituted by one or two alkyl groups having from 1 to 20 carbon atoms, with B) a methylol derivative of a polyfunctional mono- to trihydric, mono- to trinuclear phenol having at least 3 functional groups in ortho- and para-position in which derivative at least half of the reactive hydrogen atoms in the polyfunctional phenol are substituted by methylol groups and wherein the ratio of the methylol groups of the derivative of the polyfunctional phenol compound B) in said resin per mol of the dimethylolalkyl phenol compound A) in said resin is from 1.4:1 to 6:1

4,013,606

PROCESS FOR PREPARING WATER SOLUBLE IONIC POLYMERS

Edward G. Ballweber, Glenwood, and Kenneth G. Phillips, River Forest, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation of Ser. No. 385,960, Aug. 6, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 545,839

The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.

Int. Cl.² C08L *61/20*

U.S. Cl. 260—29.4 UA **10 Claims**

1. A process of preparing a dispersion of a water soluble cationic power polymer which comprises diluting with water a water-in-oil emulsion of a water soluble acrylamide polymer containing 20% by weight to 50% by weight of said acrylamide polymer, adding to said diluted emulsion a surfactant and a premix of formaldehyde and a secondary amine selected from the group consisting of dimethylamine, methylethylamine, dibutylamine, methylamylamine, methylaminoethanol, diethanolamine, morpholine and piperidine, in which the ratio of formaldehyde to said secondary amine is within the range of 10:1 to 1:10, the dilution and resultant concentration of polymer being such that the concentration of resultant cationic polymer is 1 to 10% by weight and the formation of said cationic polymer occurs in not more than 20 minutes, the weight ratio of said premix to said acrylamide polymer being within the range of 1:2 to 2:1 and the resultant cationic polymer having a cationicity of at least 60%.

4,013,607

SELF-STRIPPING COATING COMPOSITION

Sean G. Dwyer, Racine, and Daryl J. Hackbarth, Kenosha, both of Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed June 19, 1974, Ser. No. 480,981

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 H **20 Claims**

1. In a stable coating composition adapted to simultaneously disperse a previously deposited dried coating composition and replace the dried composition with a fresh coating comprising: 50–96% water, 0–10% plasticizer, 0–5% leveling agent, 0–10% organic solvent, 0–5% surfactant, 0–15% wax, 0–10% film-modifying polymer and 3–18% polymeric coating agent; with the proviso that the total non-volatiles of the composition is in the range of from 4–20% and the combined non-volatiles of the leveling agent, solvent, plasticizer, surfactant, wax and film-modifying polymer are equal to or greater than 9% and less than 200% of the non-volatiles of the polymeric coating agent; the improvement which comprises using as the polymeric coating agent a solution of an alkali-soluble resin having a weight average molecular weight from about 500 to 30,000 and an acid number from about 120 to 550, said resin being an addition resin formed from (a) at least 1 ethylenically unsaturated ligand-free monomer is selected from the group consisting of vinyl toluene, methyl methacrylate, butyl methacrylate, acrylonitrile, vinyl acetate, styrene, α-methyl styrene, butyl acrylate, ethyl acrylate, 2-ethylhexylacrylate and mixtures thereof and (b) at least 1 ethylenically unsaturated monomer having at least 1 carboxyl group is selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid, isocrotonic acid, maleic acid, fumaric acid and itaconic acid, wherein said resins contain from about 40–75% by weight of monomer (a) and from 60–25% by weight monomer (b), wherein the weight ratio of film-modifying polymer to polymeric coating agent is less than 0.57:1, adding aqueous ammonia to said composition in an amount sufficient to provide a pH of no less than 9.0, and said composition being substantially free of complex salts of cross-linking metals.

4,013,608

METHOD OF PRODUCING POLYMER SOLUTIONS OF POLYMERS OR COPOLYMERS OF VINYL CHLORIDE SERIES

Fumiya Nagoshi, Kobe; Hideyuki Arakawa, Akashi; Hayashi Uchino, Kobe; Mitsuru Echigoya, Kobe, and Masaki Matsuo, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 3, 1975, Ser. No. 554,413

Claims priority, application Japan, Mar. 5, 1974, 49-26000

Int. Cl.² C08K *5/20;* **C08L** *27/06, 27/08, 32/20*

U.S. Cl. 260—32.6 N **15 Claims**

1. A method of producing solutions of polymers or copolymers of vinyl chloride series, comprising the steps of polymerizing in at least one step in a solvent mixture consisting essentially of 30 to 55 weight percent water, remainder N,N-dimethyl formamide, 100 parts by weight of a monomer mixture comprising at least 50 weight percent of vinyl chloride and less than 50 weight percent one or more monomers copolymerizable therewith, in the presence of 0.5 to 5.0 parts by weight of a surface active agent of a salt of monomeric compound having a sulphonic acid group selected from the group consisting of alkali metal salts of vinyl sulphonic acid, methacrylic acid sulphopropyl ester, methallyl sulphonic acid and styrene sulphonic acid and using an initiator for radical polymerization, and at a temperature of between 20° to 60° C, and after treating the resulting emulsion by at least distilling water and unreacted monomers from the resulting emulsion, and wherein said monomer mixture is 10 to 40 weight percent of the total weight of said solvent mixture and said monomer mixture.

4,013,609

RESINOUS COMPOSITION

Kurt Hultzsch, Wiesbaden-Biebrich, Germany, and Helmut Fritze, Vienna, Austria, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Division of Ser. No. 345,116, March 26, 1973. This application Mar. 18, 1975, Ser. No. 559,441

Claims priority, application Germany, Mar. 29, 1972, 2215268; May 25, 1972, 2225351

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C08F *8/44, 222/02*

U.S. Cl. 260—33.6 UA **7 Claims**

1. A resinous composition containing as an essential ingredient a binder comprising a product obtained by

I. reacting in a first stage a solution of

1. a copolymer containing a radical selected from the group consisting of (a) anhydride groups of vicinal

carboxylic groups, (b) a combination of such anhydride groups with vicinal carboxylic groups, (c) a combination of said anhydride groups with other radicals capable of forming vicinal carboxylic groups and (d) a combination of said anhydride groups with vicinal carboxylic groups and with other radicals capable of forming vicinal carboxylic groups, at a temperature of 50° to 180°C, with

2. at least one alcohol containing up to 2 hydroxy groups at least one of which being a non-tertiary hydroxy group to yield a reaction product in which at least a part of the anhydride groups is converted to semiester groups, and

II. reacting

3. the product thus obtained in the presence of water at a temperature in the range from 50° to 120°C with

4. a salt-forming compound of a polyvalent metal, the solvent present in the first stage of the reaction being compatible with said alcohol and partially miscible with water only to such an extent that two phases are formed therewith together with at least one pigment and an aromatic hydrocarbon as a solvent.

4,013,610

SPARINGLY GAS-PERMEABLE SYNTHETIC RESIN COMPOSITIONS

Akira Tomohiro, Nara, and Kenzo Kaneko, Toyonaka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

Filed June 19, 1975, Ser. No. 588,166

Claims priority, application Japan, June 24, 1974, 48-72526

Int. Cl.² C08K *3/40, 9/02*

U.S. Cl. 260—37 EP **5 Claims**

1. A sparingly gas-permeable synthetic resin composition impregnated with surface-treated glass flakes obtained by contacting glass flakes with an inorganic acid solution at a pH not higher than 1.0 at a temperature of 50° C up to the boiling point of the inorganic acid solution.

4,013,611

PROCESS FOR PREPARING ELASTOMERS

Wolfgang Hechtl; Ernst Wohlfarth, and Alois Strasser, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed June 23, 1975, Ser. No. 589,282

Claims priority, application Germany, July 12, 1974, 2433697

Int. Cl.² C08L *83/04*

U.S. Cl. 260—37 SB **13 Claims**

1. An improved process for preparing compositions capable of being converted into elastomers comprising (A) triorganosiloxy-terminated diorganopolysiloxanes having at least one vinyl group in each terminal unit and a viscosity of from 10 to 5000 cP at 25° C., (B) organopolysiloxanes having from 2000 to 50,000 cP at 25° C., said organopolysiloxanes (B) containing organohydrogensiloxane units of the formula $RHSiO$, diorganosiloxane units of the formula R_2SiO and triorganosiloxy terminal units of the formula $R_3SiO_{1/2}$, in which R is selected from the group consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, (C) fillers capable of being rendered hydrophobic and having a surface area of at least 50 m^2/g and (D) catalysts which promote the addition of SiH groups to vinyl groups, the improvement which comprises mixing the organopolysiloxanes (B) with at least 75 percent by weight of fillers (C) having a surface area of at least 50 m^2/g prior to mixing the above mixture with organopolysiloxanes (A) and catalysts (D).

4,013,612

EPOXY COMPOSITION FOR ENCASING SEMICONDUCTOR DEVICES

Tooru Tamura, Ikeda; Nobuyuki Ojima, Katano; Sigeru Kondo, Higashi-Osaka, and Jizodo Yozo, Kagoshima, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Oct. 15, 1975, Ser. No. 622,729

Claims priority, application Japan, Oct. 18, 1974, 49-120838; Oct. 18, 1974, 49-120829

Int. Cl.² C08L *63/04*

U.S. Cl. 260—37 EP **4 Claims**

1. An epoxy resin composition for encasing semiconductive devices comprising a homogeneous mixture of a cresol novolak epoxy resin, phthalic anhydride as a curing agent, the amount of phthalic anhydride being 1.5 to 3 times the equivalents of epoxide groups, a derivative of imidazole as a curing accelerating agent, and the remainder being mineral filler.

4,013,613

REINFORCED INTERCRYSTALLINE THERMOPLASTIC POLYESTER COMPOSITIONS

Visvaldis Abolins, Delmar, and Fred F. Holub, Schenectady, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Oct. 1, 1971, Ser. No. 185,886

Int. Cl.² C08L *67/02*

U.S. Cl. 260—40 R **7 Claims**

1. A reinforced intercrystalline normally rigid thermoplastic molding composition comprising, in combination,

a. at least one high molecular weight normally crystalline polyester resin which very rapidly crystallizes from the melt;

b. at least one high molecular weight normally crystalline, normally amorphous or normally partially crystalline and partially amorphous polymer which polymer comprises a mixture of a polymerization product of an ethylenically unsaturated monomer and at least one difunctionally reactive compound which is polymerizable by oxidation, said polymer being present in the concentration range of from 1 to 99 parts by weight of (a) to 99 to 1 parts by weight of (b); and

c. a reinforcing amount of a reinforcing filler for said combination.

4,013,614

METHOD OF PREPARING SHAPED ARTICLES FROM POLYMERIZABLE COMPOSITIONS

James M. Self, Taylor, S.C., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 544,966, Jan. 29, 1975, which is a continuation-in-part of Ser. No. 460,489, April 12, 1974, abandoned. This application May 6, 1976, Ser. No. 684,067

Int. Cl.² C08K *3/34*

U.S. Cl. 260—40 R **11 Claims**

1. The method of preparing a cured thermoset article which comprises

A. spraying an alkaline mixture onto a substrate as a continuous mass, said alkaline mixture comprising:

1. component 1 comprising one part by weight of an unsaturated polyester resin syrup; and

2. component 2 comprising 0.1 to 10 parts by weight of aqueous sodium silicate containing 45 to 85 weight percent water and 55 to 15 weight percent sodium silicate solids having a weight ratio of SiO_2/Na_2O of 1.5 to 3.75;

the said alkaline mixture including a polymerization initiator for unsaturated polyester resin syrup; and

B. curing the said mass.

4,013,615
ELECTROSTATIC SPRAY COATING POWDER PIGMENT COMPOSITION AND PROCESS FOR PRODUCING THE SAME

Koichi Ohashi, Musashino; Yuzi Takahasi, Koganei, and Takashi Suzuki, Chofu, all of Japan, assignors to Tekkosha Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 469,537, May 13, 1974, abandoned. This application Sept. 10, 1974, Ser. No. 504,736

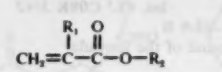
Claims priority, application Japan, May 14, 1973, 48-52474; Sept. 10, 1973, 48-101223; Sept. 26, 1973, 48-107627

Int. Cl.² C08J *3/20*

U.S. Cl. 260—42.53 **18 Claims**

1. A process for preparing powder compositions suitable for dry electrostatic spray coating, comprising the steps of emulsion polymerizing a reaction mixture of

1. first monomer component selected from the group consisting of vinyl chloride, monomer having the formula



wherein R_1 is hydrogen or methyl and R_2 is a hydrocarbon group having 1 to 18 carbon atoms, and mixtures of said monomers,

2. from 0 to 185 parts by weight, per 100 parts by weight of monomer component (1), of at least one comonomer copolymerizable with monomer component (1) and having a faster rate of polymerization than monomer component (1),
3. from 0.1 to 50 weight percent, based on the sum of components (1) and (2), of a water-insoluble pigment,
4. from 3 to 20 weight percent, based on the sum of components (1) and (2), of a water-soluble organic surfactant,
5. a water-soluble polymerization initiator in an amount effective to cause polymerization of components (1) and (2), and
6. from about 200 to about 400 weight percent, based on the sum of components (1) and (2), of an aqueous liquid medium

while simultaneously vigorously agitating the reaction mixture throughout the polymerization so that the circulation number per minute of the reaction mixture is at least 3, wherein the circulation number per minute is equal to the integrated volume of the circulating flow of the reaction mixture per minute divided by the total volume of reaction mixture, in the polymerization vessel to produce substantially spherical polymer particles having a particle size within the range of about 30 to 250 microns, a bulk density of greater than 0.3 and a volume intrinsic resistivity of at least 10^9 ohm-cm; separating the solid polymer particles from the agueous medium and drying the polymer particles.

4,013,616
MIXED POLYMERIC STRUCTURAL MATERIAL AND METHOD

Richard A. Wallace, 43 Kingscote Garden, Stanford, Calif. 94305

Continuation-in-part of Ser. No. 201,111, Nov. 22, 1971, Pat. No. 3,846,366, and a continuation-in-part of Ser. No. 438,235, Jan. 31, 1974, Pat. No. 3,991,005. This application Sept. 5, 1974, Ser. No. 503,396

Int. Cl.² C08J *11/04*

U.S. Cl. 260—42.46 **20 Claims**

1. A mixed polymeric composition comprising an intimate mixture of a comminuted filler and an adhesive polymer binder to form a continuous phase firmly bonding said filler particles together, the total polymer resin content comprising from 20% to 75% by weight of said composition, said filler comprising a comminuted fraction from a front-end solid waste system comprising glass, cellulose and its derivatives, inorganic oxides and mixed polymer resins, including a significant quantity of polyethylene and polymer incompatible with polyethylene, said polymer binder comprising a polyethylene-compatible polymer selected from the group consisting of polypropylene, polyethylene, ethylene-propylene rubber, styrene-butadiene rubber, natural rubber, polystyrene, coumarone-indene copolymers, poly(ethylene-vinyl acetate) copolymers, polyisobutylene, and mixtures thereof.

4,013,617
PROCESS FOR THE MANUFACTURE OF HYDROPHILIC POLYOLEFIN FIBERS CONTAINING INORGANIC PIGMENT

Wolfgang Gordon, Hofheim, Taunus; Hans Joachim Leugering, Frankfurt am Main, and Horst Schaefer, Schwalbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 16, 1975, Ser. No. 578,157

Claims priority, application Germany, May 18, 1974, 2424291

Int. Cl.² C08J *3/20*

U.S. Cl. 260—42.55 **12 Claims**

1. A process for the manufacture of pigmented hydrophilic polyolefin fibers which comprises heating at at least an autogenous pressure a mixture of a polyolefin, a readily vaporizable solvent for the polyolefin, water, a hydrophilizing agent which is a water-soluble emulsifier and a particulate inorganic hydrophobic pigment to form a superheated dispersion of said pigment in an emulsion comprising a mixture of a solution of said polymer in said solvent and a solution of said hydrophilizing agent in said water, and passing said superheated dispersion through a nozzle into a relatively low pressure zone to flash evaporate solvent and water from said emulsion and form hydrophilic pigmented fibers of said polyolefin polymer.

4,013,618
THERMALLY STABILIZED POLYESTER-POLYETHER BLOCK COPOLYMER COMPOSITION

Shozo Tsuji; Takahisa Minami, and Misao Sumoto, all of Otsu, Japan, assignors to Toyobo Co., Ltd., Japan

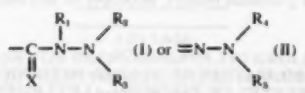
Filed Dec. 31, 1974, Ser. No. 537,760

Claims priority, application Japan, Dec. 31, 1973, 49-1189

Int. Cl.² C08J *3/20*

U.S. Cl. 260—45.8 N **17 Claims**

1. A polyester-polyether block copolymer composition comprising a polyester-polyether block copolymer consisting of segments of polyester units produced from an aromatic dicarboxylic acid and an alkylene glycol having 2 to 15 carbon atoms and segments of polyether units of an aliphatic glycol having a molecular weight of about 400 to 6,000 wherein said polyether units are contained in the ratio of 1 to 85% by weight on the basis of the whole copolymer; a stabilizing amount for said block copolymer of at least one compound containing the group of the following formula:



wherein X is oxygen or sulfur, R_1, R_2 and R_3 are each hydrogen or an organic residue selected from the group consisting of a straight or branched, saturated or unsaturated aliphatic hydrocarbon group, a saturated or unsaturated alicyclic hydrocarbon group, an aromatic hydrocarbon group, a heterocyclic group, a group wherein a hydrocarbon or heterocyclic group bonds to the nitrogen via oxygen, sulfur, imino, sulfinyl, sulfonyl, carbonyl, thiocarbonyl or hydrazo, carbazoyl, thiocarbazoyl, hydrazino or a group wherein any C-C bond in the hydrocarbon groups is intervened with oxygen, sulfur, imino,

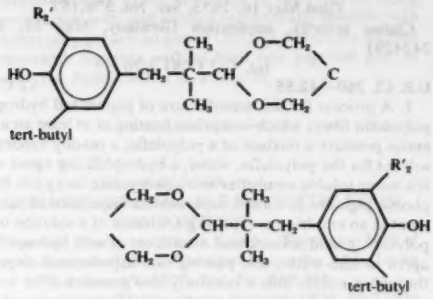
sulfinyl, or sulfonyl, or R_2 and R_3 forms a Schiff's base with the adjacent nitrogen, and R_4 and R_5 are each hydrogen or an organic residue which is the same as defined for R_1, R_2 and R_3; and a stabilizing amount for said block copolymer of at least one phenolic or amine radical scavenger and/or at least one peroxide decomposer.

4,013,619
PHENOL ACETALS

Andreas Schmidt, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

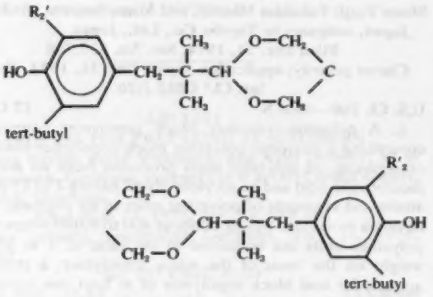
Filed Jan. 20, 1975, Ser. No. 542,631
Claims priority, application Switzerland, Jan. 21, 1974, 788/74
Int. Cl.² C08K *5/13*
U.S. Cl. 260—45.8 A **6 Claims**

1. A compound of the formula



in which R_2' denotes methyl, isopropyl or tert-butyl.

4. A composition of matter comprising an organic polymer subject to oxidative degradation containing 0.005 to 5% by weight of a stabilizer compound of the formula



in which R'_2 denotes methyl, isopropyl or tert-butyl.

4,013,620
STABILIZATION OF RUBBER WITH NICKEL COMPLEXES OF THIOBIS(p-ALKYLPHENOLS)

William Arthur Henderson, Jr., Stamford, and Arnold Zweig, Westport, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 17, 1972, Ser. No. 218,132
Int. Cl.² C08K *5/37*
U.S. Cl. 260—880 R **12 Claims**

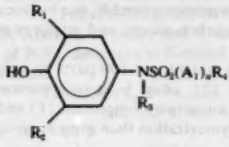
1. A composition comprising (1) a styrene, acrylic or vinyl chloride polymer modified with from about 1–75% of a grafted or ungrafted rubber, said rubber containing at least 5%, by weight, based on the total weight thereof, of repeating unsaturated hydrocarbon units and being normally subject to deterioration by oxidation, having incorporated therein, as an inhibitor against said deterioration, (2) a stabilizing concentration of a nickel complex of a 2,2'-thiobis-(p-alkylphenol) wherein the complex forming ligand (A) is water, ammonia or an aliphatic or aromatic primary, secondary or tertiary amine and said alkyl group has from 1–18 carbon atoms, inclusive, said complex being characterized by a single ligand (A) to nickel coordinate bond and a single nickel to sulfur coordinate bond for each nickel atom in the complex molecule.

4,013,621
SUBSTITUTED SULFONAMIDE DERIVATIVES OF HINDERED PHENOLS AND STABILIZED COMPOSITIONS

Martin Kneli, Ossining, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,774
Int. Cl.² C08K *5/42*
U.S. Cl. 260—45.9 R **18 Claims**

1. A compound of the formula



wherein

R_1 and R_2 are each tert-butyl,

R_3 is hydrogen, lower alkyl of 1 to 4 carbon atoms or the group

$$-SO_2(A_2)_nR_5.$$

R_4 and R_5 are each independently alkyl of 1 to 18 carbon atoms or cycloalkyl of 5 to 12 carbon atoms, providing that R_4 and R_5 may each be independently hydrogen when n is 1,

A_1 and A_2 are each independently phenyl, 1-naphthyl, 2-naphthyl, 1-(5,6,7,8-tetrahydro)naphthyl, 2-(5,6,7,8-tetrahydro)naphthyl or p-phenylene, and

n is 0 or 1.

12. A composition of matter comprising an olefinic polymer subject to degradation and from 0.01 to 5% by weight of a stabilizing compound of claim 1.

4,013,622
METHOD OF REDUCING BREAKDOWN IN POLYETHYLENE FILM

James V. DeJuneas, Hamilton Township; Gordon L. McIntyre, Trenton, and James F. O'Horo, Jr., Hightstown, all of N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed June 23, 1975, Ser. No. 589,498
Int. Cl.² B29D *7/02*; **C08L** *23/06*
U.S. Cl. 260—45.95 S **4 Claims**

1. A composition, to reduce breakdown in polyethylene blown film, comprising

a. a majority amount of low-density polyethylene of about 99 wt.%, depending on the levels of anti-block, slip, and anti-oxidant additives, based on the weight of the finished composition, and

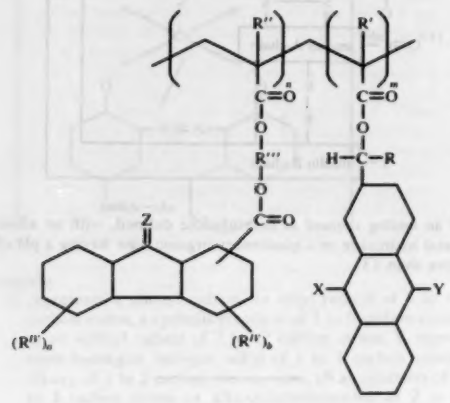
b. a minor amount of polyethylene glycol, varying from about 100 to about 600 ppm, based on the weight of the finished composition, and wherein the molecular weight of the polyethylene glycol varies from about 600 to about 20,000.

4,013,623
INTRACHAIN CHARGE TRANSFER COMPLEXES

Sam R. Turner, Webster, and Milan Stolka, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 16, 1975, Ser. No. 596,532
Int. Cl.² C08F *220/10, 220/12, 220/26*
U.S. Cl. 260—63 UY 4 Claims

1. Copolymers of the formula



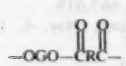
wherein
R is hydrogen or alkyl of 1–6 carbon atoms;
R′ is hydrogen or methyl;
R″ is hydrogen or methyl;
R‴ is alkyl of 1–10 carbon atoms;
R^{IV} is selected from the group consisting of —NO_2, halogen, —CN and —CF_3;
X and Y are independently selected from the group consisting of hydrogen, chlorine, bromine, alkyl of 1–4 carbon atoms and phenyl;
Z is oxygen or dicyanomethylene;
a and b are in the range of from 0–4;
n is in the range of from about 5 to about 95 percent of the total number of structural units of the copolymer; and
m is in the range of from about 5 to about 95 percent of the total number of structural units of the copolymer.

4,013,624
BRANCHED THERMOPLASTIC COPOLYESTERS

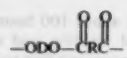
Guenther Kurt Hoeschele, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 20, 1972, Ser. No. 236,266
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C08G *63/20*
U.S. Cl. 260—75 R 16 Claims

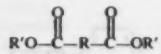
1. In a process for preparing a segmented thermoplastic copolyester, said copolyester consisting essentially of a multiplicity of recurring long chain ester units and short chain ester units joined head-to-tail through ester linkages, said long chain ester units being represented by the formula

I 

and said short chain units being represented by the formula

II 

which comprises reacting a dicarboxylic acid having a weight less than about 300; said acid being represented by the formula



wherein R is a divalent radical and R′ is independently selected from the group consisting of hydrogen and C_1–C_{10} alkyl; a poly(alkylene oxide) glycol having a molecular weight of about 400–4,000 and a carbon to oxygen ratio of about 2.0–4.3 said glycol being represented by the formula

HO—G—OH

wherein G is a divalent radical, and a diol having a molecular weight less than about 250 and represented by the formula

HO—D—OH

wherein D is a divalent radical, the improvement which comprises conducting the reaction in the presence of about 0.3 to 1.2 equivalents per 100 moles of said dicarboxylic acid of a branching agent, said branching agent being represented by the formula $(HO)_a X (COOH)_b$ wherein X is a polyfunctional radical, $a = 0–6$, $b = 0–4$ and $a + b = 3–6$, said branching agent having a molecular weight of about 92 to 5,000.

4,013,625
PROCESS FOR THE LINEARIZATION OF POLYURETHANES WITH LACTAMS AND LACTAM ADDITION COMPOUNDS

Kuno Wagner, Leverkusen, and Manfred Dahm, Berg.-Neukirchen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 383,939, July 30, 1973, abandoned. This application Dec. 2, 1975, Ser. No. 636,892
Claims priority, application Germany, Aug. 5, 1972, 2238667
Int. Cl.² C08G *18/08*
U.S. Cl. 260—77.5 AA 10 Claims

1. A process for the linearization of isocyanate polyaddition products which are cross-linked via biuret, allophanate, uretdione or uretone imine groups which comprises reacting said isocyanate polyaddition products with a lactam, or a mixture of said lactam in association equilibrium with a Zerewitinoff active hydrogen containing compound, by impregnating said isocyanate polyaddition products thereby to cause said polyaddition products to swell, maintaining the state of swelling at least 5 seconds, and thereafter at least partly removing said lactam by extraction or evaporation from said polyurethane product.

4,013,626
PROCESS FOR PREPARING POLYPYRROLIDONE WHEREIN POLYPYRROLIDONE IS WASHED WITH 2-PYRROLIDONE

Kiyoshi Katsumoto, El Cerrito, and Richard A. Wuopio, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Mar. 17, 1975, Ser. No. 559,293
Int. Cl.² C08G *69/24*
U.S. Cl. 260—78 P 6 Claims

1. A process for producing 2-pyrrolidone polymer which comprises the steps of polymerizing 2-prrolidone under substantially anhydrous conditions in a reaction mixture comprising monomer, polymerization initiator and alkaline polymerization catalyst at a temperature of from abou 18° to about

100° C for a period of from about 4 to about 100 hours to produce a solid polymeric product, and washing said solid polymeric product with 2-pyrrolidone to recover a first stream containing polymer, substantially free of said catalyst, and a second stream containing 2-pyrrolidone and catalyst.

4,013,627

OIL AND WATER REPELLENT POLYMER CONTAINING ONIUM GROUPS

Stanley Temple, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 290,769, Sept. 20, 1972, abandoned. This application Sept. 12, 1974, Ser. No. 505,221

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C08F *226/02*; **C08L** *27/12*, *39/00*

U.S. Cl. 526—245 **9 Claims**

1. Oil and water repellent solid polymer consisting essentially of, by weight:

a. 20–99% of polymer chain repeat units from a monomer of the formula $R_fCH_2CH_2OCOC(R)=CH_2$ wherein R_f is a perfluoroalkyl group of 4–14 carbon atoms and R is hydrogen or methyl;

b. 1–80% of polymer chain repeat units from a vinyl monomer which has no non-vinylic fluorine atom; and

c. 0.1–4%, based on the combined weights of (a) and (b), of polymer chain repeat units from a monomer of the formula $CH_2=C(R)—Z—Y^+X^-$ wherein R is hydrogen or methyl, Z is a connecting group which activates but does not take part in vinyl polymerization, Y^+ is an onium ionic group which is not sensitive to pH changes and X^- is a water solubilizing anion, the sum of (a) and (b) being 100%.

4,013,628

PROCESS FOR THE PREPARATION OF INSULIN, ANALOGS AND DERIVATIVES THEREOF

Rainer Obermeier, Hattersheim (Main), and Rolf Geiger, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

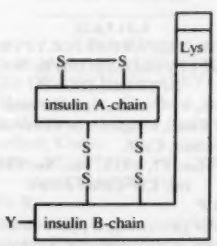
Filed Aug. 14, 1975, Ser. No. 604,667

Claims priority, application Germany, Aug. 16, 1974, 2439296

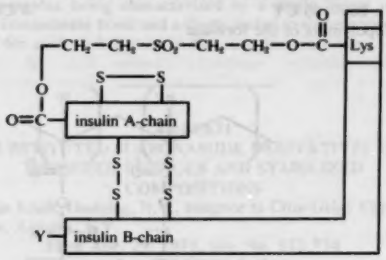
Int. Cl.² A61K *37/26*; **C07C** *103/52*

U.S. Cl. 260—112.7 **2 Claims**

1. A method for making an insulin compound of the formula



and biologically-active analogs thereof in which one or more amino acids have been exchanged for other, preferably simpler, amino acids or in which the chains are modified, preferably shortened, and in which Y is hydrogen or acyl, which method comprises treating a compound of the formula



or an analog thereof as hereinbefore defined, with an alkali metal hydroxide or a quaternary organic base having a pH of more than 13.

4,013,629

ART OF CATALYZING THE REACTION BETWEEN A POLYOL AND A POLYALDEHYDE

Robert G. Cummisford, Brookfield; Richard J. Wasielewski, Milwaukee, and Robert K. Krueger, Sheboygan, all of Wis., assignors to Krause Milling Company, Milwaukee, Wis.

Filed Feb. 21, 1975, Ser. No. 551,882

Int. Cl.² C07G *7/00*

U.S. Cl. 260—123.7 **27 Claims**

1. In the modification of a polyol with a polyaldehyde, the improvement comprising the step of controlling, by accelerating or retarding the rate of the crosslinking reaction in a liquid solvent by the use of an inorganic alkali halide as a catalyst at such a temperature and pressure relationship as to maintain said liquid condition during the reaction, the polyol and polyaldehyde being of a type which would react in the absence of an alkali halide catalyst and being of a type which are mutually solvated in a solvent for the alkali halide.

4,013,630

CHROMIUM COMPLEX DISAZO DYES

Fabio Beffa, Riehen, Switzerland, and Gerhard Back, Lorrach, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

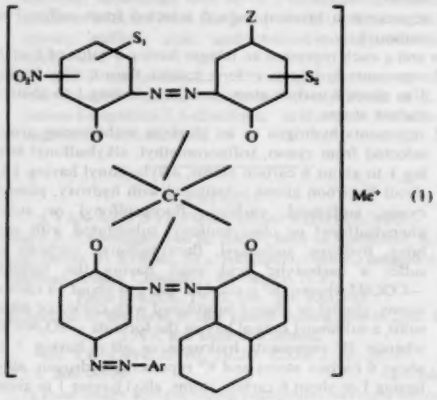
Filed Mar. 2, 1976, Ser. No. 663,019

Claims priority, application Switzerland, Mar. 4, 1975, 2697/75

Int. Cl.² C09B *45/16*

U.S. Cl. 260—145 A **6 Claims**

1. Chromium complex dyes of the formula



Me⁺ (1)

wherein

Z represents a phenyl radical, an alkyl radical of 4 to 12 carbon atoms, a cycloalkyl radical of 5 to 9 carbon atoms or an aralkyl radical of 7 to 12 carbon atoms, S_1 represents hydrogen, halogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 2 carbon atoms, nitro, alkanoylamino of 2 to 3 carbon atoms or alkoxycarbonylamino of 2 to 3 carbon atoms,

S_2 represents hydrogen, alkyl of 1 to 5 carbon atoms, alkanoylamino or alkoxycarbonylamino, each of 2 to 3 carbon atoms,

Me^+ represents a cation, and

Ar represents the radical of an aromatic diazo component which contains 1 to 3 SO_3H groups and is optionally further substituted by carboxy, halogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 2 carbon atoms or nitro.

4,013,631

MONOAZO DYESTUFFS CONTAINING AN N-β-1,2,3-TRIAZOLYLETHYL ANILINO COUPLING COMPONENT

Gerhard Wolfrum, Opladen, and Heinrich Gold, Cologne-Stammheim, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 1, 1966, Ser. No. 591,141

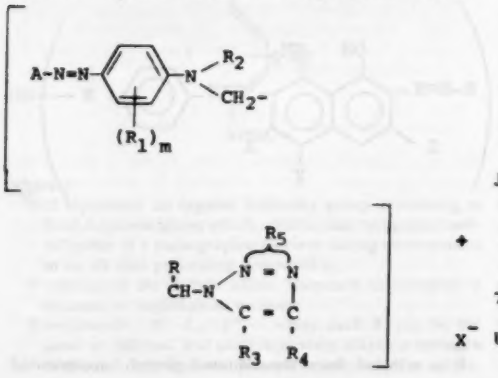
Claims priority, application Germany, Nov. 8, 1965, 47620

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

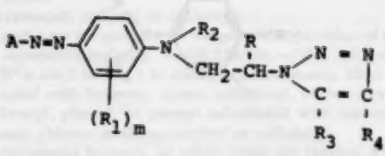
Int. Cl. C09b *29/36*; **D06p** *1/08*

U.S. Cl. 260—157 **11 Claims**

1. An azo dyestuff selected from the group consisting of



and



wherein R stands for hydrogen or methyl; R_1 is a member selected from the group consisting of chloro, bromo, lower alkyl, trifluoro lower alkyl, lower alkoxy, and acetylamino; *m* is an integer from 0 to 2; R_2 stands for hydrogen, lower alkyl, or substituted lower alkyl, wherein the substituents are selected from the group consisting of cyano and ethoxy carbonyl; R_3 and R_4 are independently selected from the group consisting of hydrogen, lower alkyl, lower alkoxy methyl, phenyl, chlorophenyl, bromophenyl, lower alkyl phenyl, carboxylic acid, carbolower alkoxy; R_5 is selected from the group consisting of lower alkyl and benzyl; A is selected from the group consisting of phenyl, substituted phenyl, thiazol (1,3)-2-yl, 5-nitro thiazol (1,3)-2-yl, benzothiazol (1,3)-2-yl, 6-chloro benzothiazol (1,3)-2-yl, 6-ethoxy benzothiazol (1,3)-2-yl, 3-phenyl-thiadiazole (1,2,4)-5-yl, pyridin-3-yl, quinolin-8-yl, indazol-3-yl, and triazol (1,2,4)-3-yl, wherein the substituents on said phenyl radical are members of the group consisting of halogen, lower alkyl, lower alkoxy, nitro, cyano, carboxy, trifluoromethyl, carboxy lower alkyl, sulphoxy lower alkyl, carbonamide, lower alkyl carbonamide, dilower alkyl carbonamide, sulfonamide, lower alkyl sulfonamide, and dilower alkyl sulfonamide; X stands for an anion; and wherein the alkyl groups contain from 1–4 carbon atoms; said dyestuff being free of sulphonic acid groups.

4,013,632

WATER INSOLUBLE 6-(2-ACYLOXY-CARBETHOXY) BENZOTHIAZOLE-AZO-BENZENE DYESTUFFS

Jean-Pierre Henri Stiot, St. Pierre les Elbeuf; Jean-Marie Louis Leroy, St. Etienne du Rouvray, and Claude Marie Henri Emile Brouard, Sotteville les Rouen, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

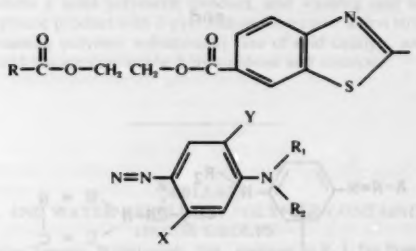
Filed June 20, 1974, Ser. No. 481,440

Claims priority, application France, June 21, 1973, 73.22695

Int. Cl.² **C09B** *29/36*; **D06P** *3/26, 3/48, 2/54*

U.S. Cl. 260—158 **3 Claims**

1. A dyestuff of formula:



in which

R is methyl or ethyl,

X is hydrogen, chlorine, methyl, ethyl, acetylamino, propionylamino, benzoylamino or cinnamoylamino,

Y is hydrogen, methoxy or ethoxy,

R_1 is alkyl having 1 to 4 carbon atoms unsubstituted or substituted by one or two chlorine, cyano, hydroxy, alkoxy containing 1 to 4 carbon atoms, acyl containing 2 to 5 carbon atoms, benzoyl, cinnamoyl, acyloxy containing 2 to 5 carbon atoms, benzoyloxy, cinnamoyloxy or carbalkoxy containing 2 to 5 carbon atoms and

R_2 is hydrogen or an alkyl group such as R_1.

4,013,633

YELLOW AZOPYRAZOLINE DYE RELEASING REDOX COMPOUNDS FOR PHOTOGRAPHIC COLOR TRANSFER

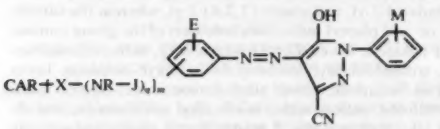
Jan R. Haase; Carl H. Eldredge, and Richard A. Landholm, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 27, 1975, Ser. No. 590,899

Int. Cl.² C09B *29/34, 29/38;* **G03C** *1/10, 1/76*

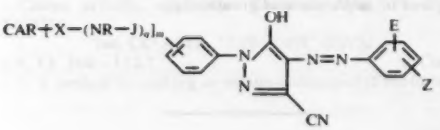
U.S. Cl. 260—162 **17 Claims**

1. A yellow image dye-releasing compound having a formula as follows



I

or



II

wherein

CAR represents a ballasted o- or p-sulfonamidophenol or o- or p-sulfonamidonaphthol carrier moiety which, as a function of oxidation under alkaline conditons, releases a diffusible dye from said compound;

X represents a bivalent linking group of the formula $—R^1—L_n—R^1_p—$ where each R^1 can be the same or different and each represents alkylene having 1 to about 8 carbon atoms; phenylene; or phenylene substituted with carboxy, chloro, methyl or methoxy; L represents a bivalent radical selected from oxy, carbonyl, carboxamido, carbamoyl, sulfonamido, sulfamoyl, sulfinyl or sulfonyl; *n* is an integer having a value of 0 or 1; *p* is 1 when *n* equals 1 and *p* is 1 or 0 when *n* equals 0, provided that when *p* is 1 the carbon content of the sum of both R radicals does not exceed 14 carbon atoms;

R represents hydrogen or alkyl having 1 to about 6 carbon atoms;

J represents a bivalent radical selected from sulfonyl or carbonyl;

m and *q* each represent an integer having a value of 0 or 1;

E represents hydrogen, chloro, bromo, fluoro, alkyl having 1 to about 4 carbon atoms or alkoxy having 1 to about 4 carbon atoms;

Z represents hydrogen or an electron withdrawing group selected from cyano, trifluoromethyl, alkylsulfonyl having 1 to about 8 carbon atoms, alkylsulfonyl having 1 to about 8 carbon atoms substituted with hydroxy, phenyl, cyano, sulfamoyl, carboxy, fluorosulfonyl or sulfo; phenylsulfonyl or phenylsulfonyl substituted with carboxy, hydroxy, sulfamoyl, fluorosulfonyl, carboxy or sulfo; a carboxylic acid ester having the formula $—COOR^2$ wherein R^2 is alkyl having 1 to about 18 carbon atoms, phenyl or phenyl substituted with chloro or nitro; sulfo, a sulfamoyl radical having the formula $—SO_2NR^3R^4$ wherein R^3 represents hydrogen or alkyl having 1 to about 6 carbon atoms and R^4 represents hydrogen, alkyl having 1 to about 6 carbon atoms, alkyl having 1 to about 6 carbon atoms substituted with hydroxy, cyano, fluorosulfonyl, carboxy or sulfo; benzyl, phenyl, phenyl substituted with hydroxy, sulfonyl, sulfamoyl, carboxy or sulfo; alkylcarbonyl having 1 to about 8 carbon atoms, or phenylcarbonyl having 6 to about 9 carbon atoms, with the proviso that the carbon content of the sum of R^3 and R^4 not exceed 14 carbon atoms; a carbamoyl radical having the formula $—CON(R^3)_2$ wherein each R^3 can be the same or different and is as described previously; and

M represents hydrogen, a solubilizing group or precursor thereof selected from carboxy, sulfo, a sulfamoyl radical as described for Z or a carboxylic acid ester as described for Z.

4,013,634

TETRAAZO DIRECT UREA-DERIVED DYE HAVING A CORE OF H-ACID, K-ACID OR S-ACID

Harvey Irvin Stryker, Carneys Point, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

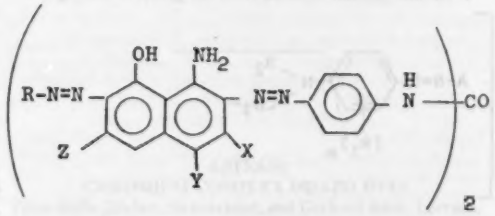
Filed Feb. 21, 1974, Ser. No. 444,294

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C09B *43/14*

U.S. Cl. 260—167 **5 Claims**

1. A water-soluble dye of the formula



2

wherein:

R is selected from unsubstituted phenyl, unsubstituted

naphthyl, phenyl substituted with up to 3 substituents and naphthyl substituted with up to 3 substituents, said substituents selected from the group methyl, ethyl, methoxy, ethoxy, sulfonic acid, and chlorotrimethylammonium acetyl, and

X, Y and Z are substituted so as to give derivatives of at least one of 1-amino-8-naphthol-4,6-disulfonic acid, 1-amino-8-naphthol-3,6-disulfonic acid, and 1-amino-8-naphthol-4-sulfonic acid.

4,013,635

CYAN AZO DYE-PROVIDING COMPOUNDS

Richard A. Landholm; Jan R. Haase, both of Rochester, N.Y., and James J. Krutak, Sr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

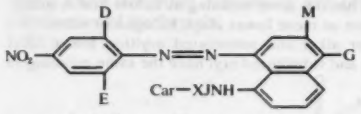
Filed Feb. 26, 1975, Ser. No. 553,381

The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.

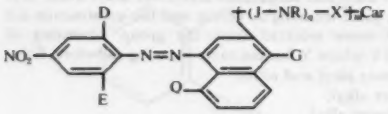
Int. Cl.[2] C09B 29/10, 29/20; G03C 5/30, 5/54

U.S. Cl. 260—199 12 Claims

1. A cyan image dye-providing compound having a formula as follows:

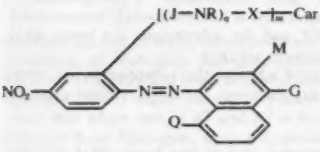


I.



II.

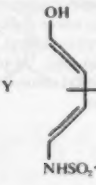
or



III.

wherein

Car represents a carrier moiety which, as a function of oxidation under alkaline conditions, releases a diffusible dye from said compound and having the formula



wherein

Ball represents an organic ballasting group containing at least 8 carbon atoms which renders said compound non-diffusible in a photographic element during development in an alkaline processing composition;

Y represents the carbon atoms necessary to complete a benzene or naphthalene nucleus;

X represents $-R^2-L_n-R^2_p-$ where each R^2 can be the same or different and each represents alkylene having 1 to about 8 carbon atoms; phenylene; or phenylene substituted with chloro, bromo, cyano, nitro, methoxy, methyl, ethyl, carboxy, or sulfo; L represents oxy, carbonyl, carboxamido, carbamoyl, sulfonamido, sulfamoyl, sulfinyl or sulfonyl; n is an integer having a value of 0 or 1; p is 1 when n equals 1 and p is 1 or 0 when n equals 0, provided that when p is 1 the carbon content of the sum of both R^2 radicals does not exceed 14 carbon atoms;

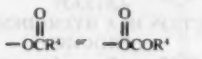
R represents hydrogen, or alkyl having 1 to about 6 carbon atoms;

J represents sulfonyl or carbonyl;

m and q each represent an integer having a value of 0 or 1;

Q represents hydroxy, $-NHCOR^3$ or $-NHSO_2R^3$ wherein R^3 is alkyl having 1 to about 6 carbon atoms, alkyl substituted with hydroxy, cyano, sulfamoyl, carboxy or sulfo; benzyl, phenyl, or phenyl substituted with carboxy, cyano, chloro, methoxy, methyl or sulfamoyl;

G represents hydroxy, an alkali metal salt thereof, a photographically inactive amine salt thereof, or a hydrolyzable acyloxy group having the formula:



wherein R^4 is alkyl having 1 to about 18 carbon atoms, phenyl or phenyl substituted with chloro or nitro;

D represents halogen, cyano, nitro, trifluoromethyl, alkyl having 1 to about 6 carbon atoms, alkoxy having 1 to about 6 carbon atoms, carboxy, $-COOR^4$ wherein R^4 is as described previously, fluorosulfonyl, trifluoromethylsulfonyl, $-SO_3$-phenyl or $-SO_3$-phenyl substituted with hydroxy, chloro, carboxy, sulfamoyl, methyl or methoxy; sulfo, $-SO_2NR^5R^6$ wherein R^5 represents hydrogen or alkyl having 1 to about 6 carbon atoms and R^6 represents hydrogen, alkyl having 1 to about 6 carbon atoms, alkyl having 1 to about 6 carbon atoms substituted with hydroxy, cyano, sulfamoyl, carboxy or sulfo; benzyl, phenyl, phenyl substituted with hydroxy, sulfonyl, sulfamoyl, carboxy, or sulfo; alkylcarbonyl having 1 to about 8 carbon atoms, or phenylcarbonyl, with the proviso that the carbon content of the sum of R^5 and R^6 not exceed 14 carbon atoms; also R^5 and R^6 may be combined with the nitrogen atom to which they are attached to form morpholino or piperidino; $-CON(R^5)_2$ wherein each R^5 can be the same or different and is as described previously; alkylsulfonyl having 1 to about 8 carbon atoms, alkylsulfonyl having 1 to about 8 carbon atoms substituted with hydroxy, chloro, phenyl, cyano, sulfamoyl, carboxy or sulfo; phenylsulfonyl or phenylsulfonyl substituted with hydroxy, sulfamoyl, fluorosulfonyl, carboxy or sulfo;

E represents hydrogen, halogen, nitro, cyano or trifluoromethyl; and

M represents sulfo, cyano, fluorosulfonyl, halogen, $-SO_3$-phenyl, a $-SO_3$-phenyl substituted with hydroxy, chloro, carboxy, sulfamoyl, methyl or methoxy; alkylsulfinyl having 1 to about 8 carbon atoms, alkylsulfinyl having 1 to about 4 carbon atoms substituted with cyano, hydroxy or carboxy; phenylsulfinyl; $-SO_2NR^5R^6$, or $-CON(R^5)_2$ wherein R^5 and R^6 are as described previously; alkylsulfonyl having 1 to about 8 carbon atoms, alkylsulfonyl having 1 to about 6 carbon atoms substituted with hydroxy, chloro, phenyl, cyano, sulfamoyl, carboxy or sulfo; or phenylsulfonyl substituted with hydroxy, sulfamoyl, fluorosulfonyl, carboxy or sulfo;

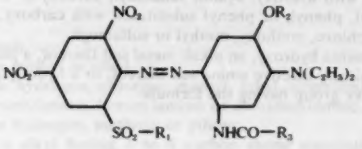
with the proviso that there be no more than one sulfo radical and no more than one carboxy radical present in said compound.

4,013,636
N,N-DIETHYL-4-(2,4-DINITRO-6-ALKYLSULFONYL-PHENYLAZO)-2-ALKOXY-5-ALKYL-CARBONYLAMINOANILINES

Ruedi Altermatt, Buckten, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Dec. 17, 1974, Ser. No. 533,522
Claims priority, application Switzerland, Dec. 21, 1973, 18039/73
Int. Cl.² C09B 29/26; D06P 3/26, 3/42, 3/54
U.S. Cl. 260—207 7 Claims

1. A compound of the formula

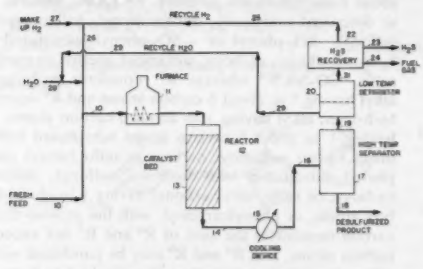


wherein each of R_1, R_2 and R_3 is independently methyl or ethyl.

4,013,637
WATER INJECTION IN A HYDRODESULFURIZATION PROCESS

Paul E. Eberly, Jr., Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed June 3, 1975, Ser. No. 583,467
Int. Cl.² C10G 23/02
U.S. Cl. 208—216 14 Claims



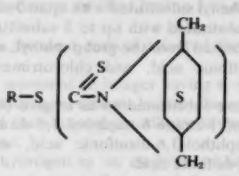
1. A hydrodesulfurization process which comprises contacting, in a reaction zone, at hydrodesulfurization conditions, a substantially non-metal containing sulfur-bearing hydrocarbon feed selected from the group consisting of naphthas, vacuum gas oils, virgin gas oils, thermal and catalytic cycle oils, with a hydrogen-containing treating gas and a catalyst consisting essentially of cobalt metal, oxide or sulfide thereof and molybdenum metal, oxide or sulfide thereof; composited with an alumina carrier, and injecting into said reaction zone from about 1 to about 32 volume percent H_2O based on said hydrogen-containing treating gas at start-of-run reaction zone temperatures ranging from about 550° to less than about 750° F., and discontinuing said injection of H_2O into said reaction zone when the reaction zone temperature is about 750° F.

4,013,638
AZABICYCLONONANECARBODITHIOIC ACID

John J. D'Amico, Dunbar, W. Va., assignor to Monsanto Company, St. Louis, Mo.

Filed Jan. 18, 1965, Ser. No. 426,348
Int. Cl.² C07D 401/12, 403/12, 411/12
U.S. Cl. 260—239 BA 16 Claims

1. A compound of the formula



where R is selected from a group consisting of $—SCCl_3$, $Y—S_x$ where x is an integer from 0 to 3, inclusive, and Y is the radical in parentheses,

lower alkyl,
cyano lower alkyl,
isothiocyano lower alkyl,
amino lower alkyl where amino is NH_2, lower alkyl NH—, (lower alkyl)$_2$N-, 1-pyrrolidinyl, piperidino, morpholino, or 1-hexamethyleniminyl,
lower alkenyl,
halogen-substituted lower alkenyl,
cyclohexenyl,
alkadienyl of 6 to 10 carbon atoms
aryl where aryl is phenyl or naphthyl and substituted aryl where aryl has the same meaning as before and is substituted by one or more lower alkyl, halogen or nitro,
arylthio lower alkyl and substituted arylthio lower alkyl where aryl and substituted aryl have the same meaning as before
lower alkynyl,
aryl lower alkyl and substituted aryl lower alkyl where aryl has the same meaning as before and the substituents are one or more selected from the group consisting of $—CH_2SY$ where Y has the same meaning as before, halogen, lower alkyl and nitro,
furyl lower alkyl,
pyranyl lower alkyl,
5-hydroxy pyranonyl lower alkyl,
2-phenyleneazolyl and substituted 2-phenyleneazolyl wherein phenyleneazolyl is benzothiazolyl, benzoxazolyl, or benzimidazolyl, and the substituents are lower alkyl, chloro, nitro, or lower alkoxy,
substituted 2-thiazolyl wherein the substituents are lower alkyl, lower alkoxy carbonyl, carbamyl, anilino carbonyl or acetyl
2-pyrimidinyl,
2-pyrimidinyl containing one or two lower alkyl substituents,
phthalazinyl,
imidomethyl wherein imido is phthalimido, succinimido, maleimido or tetrahydrophthalimido,
$—CH(SY)C(O)R'$, and
$—CH_2C(O)R'$ where Y has the same meaning as before and R'is lower alkoxy or amino; where amino is NH_2, monolower alkylamino, di(lower alkyl)amino, 3-azabicyclo(3.2.2) non-3yl, 1-pyrrolidinyl, piperidino, morpholino, 1-hexamethyleniminyl, N-phenyl-N-lower alkylamino, N-(4-anilinophenyl)amino and N-lower alkyl-N-(4-anilinophenyl)amino;
ammonium,
alkali metal,
alkaline-earth metal,
zinc,
copper,
lead, and
iron;
substituted ammonium selected from the group consisting of:
mono(lower alkyl) ammonium,
di(lower alkyl) ammonium,
tri(lower alkyl) ammonium,
cyclohexyl ammonium,
dicyclohexyl ammonium,
pyrrolidinium,

piperidinium,
hexamethyleniminium,
morpholinium,
3-azoniabicyclo(3.2.2) nonane,
N,N-di(lower alkyl) cyclohexylammonium,
N,N-di(lower alkyl) N-phenylammonium, and
triethanol ammonium.

4,013,639

PREPARATION OF ASYMMETRIC IMINODIBENZYL COMPOUNDS

Ryoichi Kitamura; Eiichi Kitamura; Tetsuo Kitamura, and Tameo Kitamura, all of Suita, Japan, assignors to Eiichi Kitamura; Tetsuo Kitamura and Tameo Kitamura, all of Osaka, Japan

Filed July 24, 1973, Ser. No. 382,120

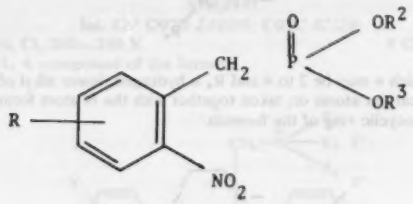
Claims priority, application Japan, July 24, 1972, 47-74367; July 24, 1972, 47-74368

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

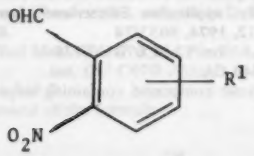
Int. Cl.² C07D *223/28*

U.S. Cl. 260—239 D **8 Claims**

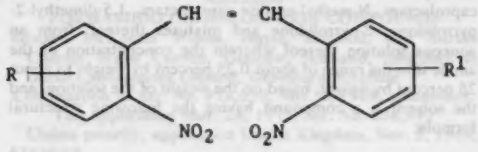
1. A process for preparing asymmetric iminodibenzyl derivatives, which comprises condensing a 2-nitrobenzyl phosphonic ester of the formula:



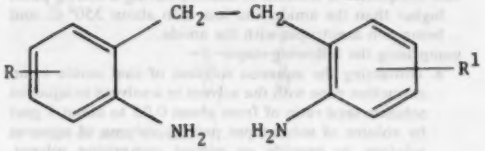
wherein R is one or more substituents selected from the group consisting of hydrogen, halogen, amino, sulfamoyl, lower alkyl, lower alkoxy and lower alkanoyl, and R^2 and R^3 are each hydrogen, lower alkyl, phenyl or phenyl (lower) alkyl, provided that when one of R^2 and R^3 is hydrogen, the other is different from hydrogen, with a 2-nitrobenzaldehyde of the formula:



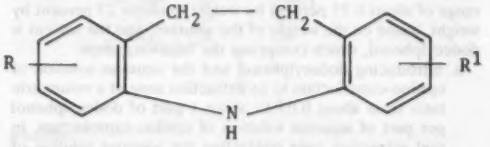
wherein R^1 is one or more substituents selected from the group consisting of hydrogen, halogen, amino, sulfamoyl, lower alkyl, lower alkoxy and lower alkanoyl, R and R^1 being asymmetrically attached to the respective positions of the benzene rings when R and R^1 are the same or different or being different when R and R^1 are attached to the same positions on the respective benzene rings, in an inert organic solvent in the presence of a condensing agent selected from the group consisting of an alkali metal alcoholate, sodium hydride and sodium amide, reducing the resultant 2,2′-dinitrostilbene of the formula:



wherein R and R^1 are each the same as defined above, by catalytic hydrogenation or in the presence of a reducing agent, and ringclosing the resultant 2,2′-diaminodibenzyl of the formula:



wherein R and R^1 are each the same as defined above, by heating in the presence or absence of a catalyst, to give an iminodibenzyl of the formula:



wherein R and R^1 are each the same as defined above.

4,013,640

PROCESS FOR THE RECOVERY OF AMIDES

George S. Somekh, New Rochelle, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

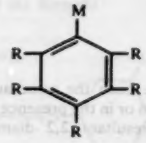
Filed Apr. 11, 1974, Ser. No. 459,968

Int. Cl.² C07D *201/16*

U.S. Cl. 260—239.3 A **10 Claims**

1. A solvent extraction-distillation process for the recovery of a water-soluble amide selected from the group consisting of

an aliphatic amide having 1 to 8 carbon atoms, epsilon-caprolactam, N-methyl-epsilon-caprolactam, 1,5-dimethyl-2-pyrrolidone, 2-pyrrolidone and mixtures thereof, from an aqueous solution thereof wherein the concentration of the amide is in the range of about 0.25 percent by weight to about 25 percent by weight, based on the weight of the solution, and the solvent is a compound having the following structural formula:



wherein M is OH or CH_2OH, R is hydrogen or an alkyl radical, there being at least one alkyl radical, and the total number of carbon atoms in all of said alkyl radicals taken together is 3 to 12, or a mixture of isomers thereof,

said compound or mixture of isomers having a boiling point higher than the amide and less than about 350° C. and being non-azeotropic with the amide,

comprising the following steps:

a. contacting the aqueous solution of said amide in an extraction zone with the solvent in a solvent to aqueous solution feed ratio of from about 0.05 to about 1 part by volume of solvent per part by volume of aqueous solution, to provide an extract comprising solvent, amide, and no more than about 5 percent by weight of water based on the weight of the solution, and a raffinate comprising at least about 95 percent by weight of water based on the weight of the solution and less than about 5 percent by weight of solvent based on the weight of the solvent;

b. introducing the extract from step (a) into a distillation zone, wherein the pressure is less than about 500 millimeters of mercury and the temperature is less than the decomposition temperatures of the amide and the solvent at said pressure, to separate the solvent from a mixture of amide and water; and

c. recovering the mixture of amide and water.

9. A solvent extraction-distillation process for the recovery of epsilon-caprolactam from an aqueous solution thereof wherein the concentration of epsilon-caprolactam is in the range of about 0.25 percent by weight to about 25 percent by weight, based on the weight of the solution, and the solvent is dodecylphenol, which comprises the following steps:

a. introducing dodecylphenol and the aqueous solution of epsilon-caprolactam to an extraction zone at a volumetric ratio from about 0.05 to about 1 part of dodecylphenol per part of aqueous solution of epsilon-caprolactam, in said extraction zone contacting the aqueous solution of epsilon-caprolactam with dodecylphenol to provide an extract comprising dodecylphenol, epsilon-caprolactam and no more than about 5 percent by weight of water based on the weight of said aqueous solution of epsilon-caprolactam, and a raffinate comprising at least about 95 percent by weight of water based on the weight of said aqueous solution of epsilon-caprolactam and less than about 5 percent by weight of dodecylphenol based on the total weight of dodecylphenol fed to the extraction zone;

b. introducing the mixture of epsilon-caprolactam and dodecylphenol from step (a) into a distillation zone wherein the pressure is less than about 500 millimeters of mercury and the temperature is less than the decomposition temperatures of the epsilon-caprolactam and dodecylphenol at said pressure, to separate epsilon-caprolactam from the dodecylphenol; and

c. recovering the epsilon-caprolactam.

4,013,641

INDOLOBENZOXAZEPINES

Richard E. Brown, East Hanover, N.J., assignor to Xerox Corporation, Stamford, Conn.

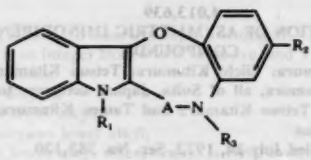
Filed Oct. 8, 1975, Ser. No. 620,734

Int. Cl.² C07D 498/04

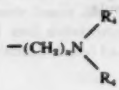
U.S. Cl. 260—239.3 P **15 Claims**

1. A substituted indolobenzoxazepine of the formula:

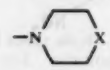
I



wherein R_1 is hydrogen, lower alkyl of 1 to 6 carbon atoms or an aralkyl group of 1 to 6 carbon atoms in the chain; R_2 is hydrogen, a halogen, lower alkyl of 1 to 6 carbon atoms or a trifluoromethyl group; A is a methylene group or a carbonyl group; R_3 is hydrogen, lower alkyl of 1 to 6 carbon atoms, or an ω-aminoalkyl group of the formula



in which n may be 2 to 4 and R_4 is hydrogen, lower alkyl of 1 to 6 carbon atoms or, taken together with the N atom form a heterocyclic ring of the formula



wherein X is oxygen, sulfur, $—CH_2CH_2—$, a bond connecting the adjacent carbon atoms, or $CH\text{-}R_5$ or $N\text{-}R_5$ wherein R_5 is hydrogen or lower alkyl of 1 to 6 carbon atoms.

4,013,642

HETEROCYCLIC COMPOUNDS CONTAINING SULPHO GROUPS

Hans Rudolf Meyer, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

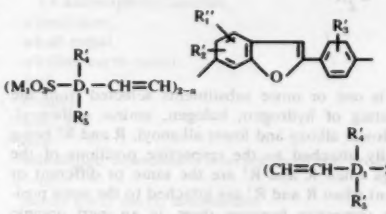
Filed June 10, 1975, Ser. No. 585,739

Claims priority, application Switzerland, June 12, 1974, 8031/74; June 12, 1974, 8033/74

Int. Cl.² C07D 307/78

U.S. Cl. 260—240 CA **7 Claims**

1. A heterocyclic compound containing sulpho groups of the formula



wherein

n denotes the number 1 or 2,

R'_2 denotes hydrogen or, if n is the number 2, conjointly

with R''$_1$, in the 4,5-position or the 6,7-position, denotes 1,3-butadienylene or in the 5,6-position denotes trimethylene;

R'$_3$ denotes hydrogen and, if *n* is the number 1, also chloro, alkoxy of 1 to 4 carbon atoms or 4-phenyl;

R'$_4$ denotes hydrogen or, if D$_1$ denotes phenylene, also chloro, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms;

R'$_5$ denotes hydrogen or, if D$_1$ denotes phenylene, also alkoxy of 1 to 4 carbon atoms;

R''$_1$ denotes hydrogen, chloro or, if *n* is the number 2, also methoxy, cyclohexyl or phenyl or, conjointly with R'$_2$ in the 4,5-position on the 6,7-position, denotes said 1,3-butadienylene or in the 5,6-position denotes said trimethylene;

D$_1$ denotes phenylene or 4,4'-biphenylene; and

M$_1$ denotes a hydrogen ion, alkali metal ion, alkaline earth metal ion, ammonium ion or amine salt ion.

4,013,643

N,N-DISUBSTITUTED 2,3-DIPHENYLALLYLAMINES

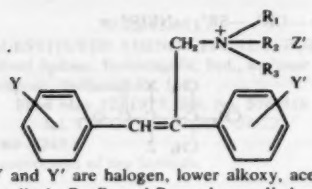
Leonard N. Nysted, Highland Park, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation of Ser. No. 417,289, Nov. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 215,923, Jan. 6, 1972, abandoned. This application July 25, 1975, Ser. No. 599,311

Int. Cl.² C07D *239/06*; **C07C** *87/29*

U.S. Cl. 260—240 K **5 Claims**

1. A compound of the formula



wherein Y and Y' are halogen, lower alkoxy, acetamido or hydrogen radicals, R$_1$, R$_2$ and R$_3$ are lower alkyl radicals and Z is a halogen atom.

4,013,644

[8 α(E), 13aβ]-5,8,13,13A-TETRAHYDRO-2,3,10,11-TETRAMETHOXY-8-(2-PHENYLETHENYL)-6H-DIBENZO[a,g-]QUINOLIZINES AND INTERMEDIATES THERETO

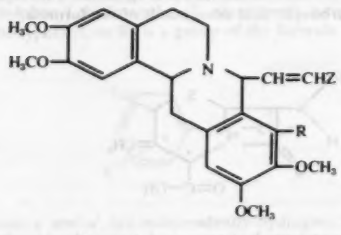
George R. Lenz, Glenview, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 15, 1976, Ser. No. 666,803

Int. Cl.² C07D *215/14*

U.S. Cl. 260—240 D **3 Claims**

1. A compound of the formula



wherein Z represents phenyl optionally substituted by fewer than 4 methoxys and R represents hydrogen or methyl.

4,013,645

FORMAMIDO CEPHALOSPORIN COMPOUNDS

Edward McKenzie Wilson, Hayes, England, and Adrian Charles Ward Curran, Glascow, Scotland, assignors to Glaxo Laboratories Limited, Greenford, England

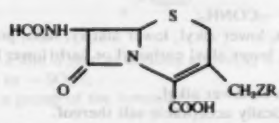
Continuation of Ser. No. 874,039, Nov. 4, 1969, abandoned. This application Mar. 28, 1972, Ser. No. 238,992

Claims priority, application United Kingdom, Nov. 5, 1969, 52438/68

Int. Cl.² C07D *501/20*

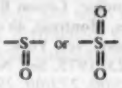
U.S. Cl. 260—243 C **3 Claims**

1. A compound of the formula:



(II)

wherein R is an alkyl group containing 1–4 carbon atoms and Z is —O—, —S—,



or a slat or ester thereof.

4,013,646

1-(ω-HALOALKYL)-ISATOIC ANHYDRIDES

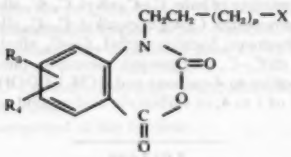
Goetz E. Hardtmann, Florham Park, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 373,474, June 25, 1973, Pat. No. 3,894,022. This application Aug. 6, 1975, Ser. No. 602,387

Int. Cl.² C07D *265/26*

U.S. Cl. 260—244 A **2 Claims**

1. A compound of the formula:



wherein

p is 0 or 1

each of R$_3$ and R$_4$ is, independently, hydrogen, halo of atomic weight of from 18 to 36, alkyl of 1 to 3 carbon atoms or alkoxy of 1 to 3 carbon atoms, and

X is halo of atomic weight of from 35 to 127.

4,013,647

MORPHOLINE CONTAINING TETRAZOLE-5-CARBOXAMIDE DERIVATIVES

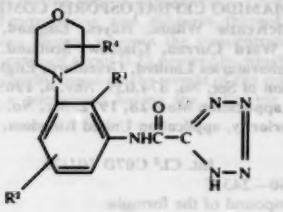
John H. Sellstedt, Pottstown, and Dieter H. Klaubert, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,570

Int. Cl.² C07D *413/02*

U.S. Cl. 260—247.2 A **4 Claims**

1. A compound of the formula:



in which

R^1 is —CN or —$CONH_2$;

R^2 is hydrogen, lower alkyl, lower alkoxy, halo, polyhalo(lower)alkyl, lower alkyl carbonyl or carb(lower) alkoxy; and

R^4 is hydrogen or lower alkyl;

or a pharmaceutically acceptable salt thereof.

4,013,648

$\Delta^{2,3}$-O-2-ISOCEPHEM-4-CARBOXYLIC ACID AND DERIVATIVES AS ANTIBACTERIAL AGENTS

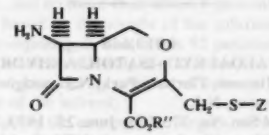
Donald E. Horning, Candiac; Leeson R. Morris, St. Lambert, and James L. Douglas, Montreal, all of Canada, assignors to Bristol-Myers Company, New York, N.Y.

Filed July 23, 1975, Ser. No. 598,461

Int. Cl.² C07D *265/00, 273/00, 295/00;* **A01N** *9/00*

U.S. Cl. 260—244 R **23 Claims**

1. The compound of the formula



wherein R'' is hydrogen or an easily cleavable ester carboxyl-protecting group and Z represents a 5- or 6-membered heterocyclic ring containing N, O or S, said heterocyclic ring being optionally substituted by one or two substituents selected from the group consisting of halo, C_1–C_4 alkyl, C_1–C_4 alkoxy, cyano, carboxyl, amino, nitro, C_3–C_4 cycloalkyl, C_2–C_4 alkenyl, trifluoromethyl, hydroxy, hydroxymethyl, C_1–C_4 alkylthio, C_1–C_4 alkylamino, di(C_1–C_4 alkyl)amino, mercapto, phenyl, benzyl, alkoxyalkyl of up to 4 carbons and -$(CH_2)_n$COOH in which n is an integer of 1 to 4, or carboxylic acid or acid addition salts thereof.

4,013,649

METHOD OF MAKING 4-AMINO-6-T-BUTYL-3-MERCAPTO-1,2,4-TRIAZIN-5-ONE

Mitchell Joseph Bogdanowicz, Jr., Spencerport, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 385,750, Aug. 6, 1973, abandoned. This application Oct. 11, 1974, Ser. No. 514,259

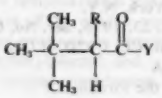
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07D *253/06*

U.S. Cl. 260—248 AS **9 Claims**

1. A method of making 4-amino-6-t-butyl-3-mercapto-1,2,4-triazin-5-one which comprises:

a. reacting a compound of the formula:



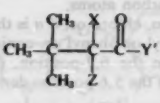
I

where

R is H, Br or Cl and

Y is Cl, Br or OH;

with Br_2 or Cl_2, in the presence of a catalyst when Y is OH, to produce a compound of the formula:

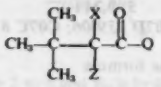


II

where X and Z are each independently Cl or Br and Y' is Cl or Br; then, contacting the compound with a compound selected from R^1OH, R^1SH and R^2R^3NH, where R^1 is H, C_1–C_4 alkyl, phenyl, benzyl,

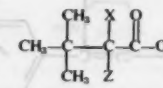
an alkali metal cation, or an alkaline earth metal cation, and R^2 and R^3 are each independently H, C_1–C_4 alkyl, phenyl or benzyl;

to form a compound of the formula:



III

where Q is —OR^1, —SR^1, —NR^2R^3 or



then

b. reacting the product of step a. with thiocarbohydrazide in a polar inert solvent.

4,013,650

PROCESS FOR THE MANUFACTURE OF 3-METHYLENE-CEPHAM COMPOUNDS

Bruno Fechtig, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

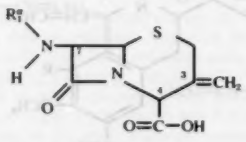
Filed Dec. 17, 1973, Ser. No. 425,343

Claims priority, application Switzerland, Jan. 9, 1973, 224/73; Mar. 5, 1973, 4609/73

Int. Cl.² C07D *501/04*

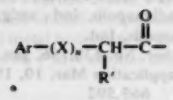
U.S. Cl. 260—243 C **10 Claims**

1. Process for the manufacture of α-7β-amino-3-methylene-cepham-4-carboxylic acid compounds of the formula



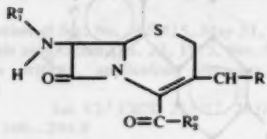
(I)

where R_1^c represents hydrogen or 5-aminoadipoyl, wherein amino may be protected by benzoyl, or an acyl group of the formula



(B),

wherein Ar represents phenyl, hydroxyphenyl or hydroxychlorophenyl, thienyl, or furyl, X represents oxygen *n* represents 0 or 1 R′ represents hydrogen or, if *n* represents O, R′ represents amino, amino protected by α-polybranched lower alkoxycarbonyl or p-methoxybenzyloxycarbonyl, 1-oxide thereof, or a salt of such compound which consists essentially of reducing a 7β-amino-3-acyloxymethyl-3-cephem-4-carboxylic acid compound of the formula



(III)

wherein R_1 ° has the above-mentioned meaning, R denotes acetoxy, R_2° is hydroxyl or R and R_2° together denote an epoxy group, a 1-oxide thereof or a salt of such a compound, with an amalgam of aluminum at a pH of 2 to 7, in the presenceof water at a temperature of between 0° to 100°.

4,013,651

3-SUBSTITUTED AMINO-CEPHALOSPORINS

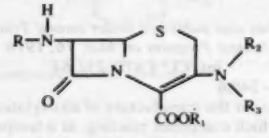
Wayne Alfred Spitzer, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 12, 1975, Ser. No. 576,818

Int. Cl.² C07D *501/20, 501/22*

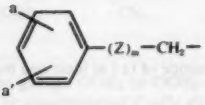
U.S. Cl. 260—243 C **10 Claims**

1. The compound of the formula



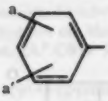
wherein R is hydrogen or an acyl group

and R′ is C_1–C_6 alkyl, C_1–C_3 cyanoalkyl, phenyl, halophenyl, methylphenyl, hydroxyphenyl, nitrophenyl, aminophenyl, or methoxyphenyl; or R′ is a group of the formula



wherein *a* and *a′* are independently hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen, nitro, amino, or carboxy, Z is O or S, and *m* is 0 or 1;
or R′ is a group of the formula

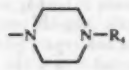
wherein P is thienyl, phenyl or



wherein *a* and *a′* are as defined above; Q is hydroxy, amino, carboxy or $-SO_3H$;
or R′ is a group of the formula

$R''—CH_2—$

wherein R″ is thienyl, furyl, 2-oxazolyl, 2-thiazolyl, or 1-tetrazolyl; R_1 is benzyl, 4-nitrobenzyl, 4-methoxybenzyl, diphenylmethyl, t-butyl or 2,2,2-trichloroethyl;
and R_2 and R_3 when taken separately are independently C_1–C_4 alkyl, benzyl or phenethyl, and when taken together with the attached nitrogen are pyrrolidino, piperidino, morpholino, thimorpholino or a 4-substituted piperazino group of the formula



wherein R_4 is C_1–C_4 lower alkyl.

4,013,652

PYRIDOPYRROLOBENZOXAZINE

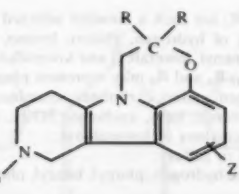
Parthasarathi Rajagopalan, Westbury, N.Y., assignor to Endo Laboratories, Inc., Garden City, N.Y.

Division of Ser. No. 357,528, May 7, 1973, Pat. No. 3,914,421, which is a continuation-in-part of Ser. No. 263,766, June 19, 1972, abandoned. This application June 13, 1975, Ser. No. 586,746

Int. Cl.² C07D *265/00, 273/00, 295/00;* **A01N** *9/00*

U.S. Cl. 260—244 R **4 Claims**

1. The compound of the formula:



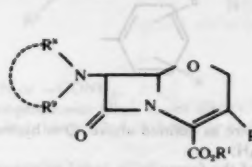
where
The R's are the same or different and are H or CH_3, and one of them can be C_5–C_6 alkyl or phenyl;
R^1 is hydrogen, C_1–C_4 alkyl, C_5–C_6 cycloalkyl, C_5–C_4 alkoxy-carbonyl, or substituted C_1–C_4 alkyl where the substituent is the C_5–C_6 cycloalkyl or phenyl; and
Z is H, Cl or CH_3;
or its pharmaceutically suitable salts.

4,013,653
1-OXACEPHEMS

Saul Wolfe, Kingston, Canada, assignor to Queen's University at Kingston, Kingston, Canada

Filed July 21, 1975, Ser. No. 597,128
Claims priority, application United Kingdom, June 30, 1975, 34614/75
Int. Cl.² C07D 265/00, 273/00, 295/00
U.S. Cl. 260—244 R 9 Claims

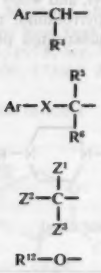
4. The compound of the formula:



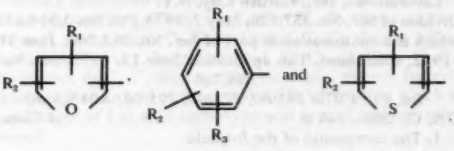
wherein R^9 is hydrogen and R^8 is hydrogen or

RCO-

wherein R is selected from the group consisting of



wherein Ar is a monovalent radical selected from the group consisting of



wherein

R_1, R_2 and R_3 are each a member selected from the group consisting of hydrogen, chloro, bromo, iodo, trifluoromethyl, phenyl, loweralkyl and loweralkoxy, but only one of said R_1, R_2 and R_3 may represent phenyl;

R^4 is hydrogen, amino, carbobenzoxyamino, phenyl, fluoro, chloro, bromo, iodo, carboxyl, SO_3H, azido, hydroxy, loweralkanoyloxy or loweralkoxy;

X is oxygen or sulfur;

R^5 and R^6 are hydrogen, phenyl, benzyl, phenethyl or loweralkyl;

Z^1, Z^2 and Z^3 are loweralkyl or the Ar- group;

R^{12} is 2,2,2-trichloroethyl or benzyl;

provided that when R^8 and R^9 are taken together with the nitrogen to which they are attached, they form a phthalimido moiety;

R^7 is methyl or hydroxy; and

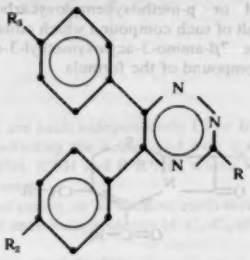
R^1 is hydrogen, loweralkyl, benzyl, benzhydryl, loweralkoxyloweralkyl, loweralkoxybenzyl, phenacyl, trimethylsilyl, 2,2,2-trichlorethyl, or pivaloyloxy.

4,013,654
5,6-DIARYL-1,2,4-TRIAZINES

William B. Lacefield, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 438,156, Jan. 31, 1974, Pat. No. 3,948,894. This application Mar. 10, 1976, Ser. No. 665,592
Int. Cl.² C07D 253/06
U.S. Cl. 260—248 AS 13 Claims

1. The compound of the formula,



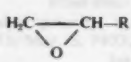
wherein R is hydrogen or $-(X)_nR_1$, in which X is either O or S, n is an integer which is either 0 or 1, and R_1 is C_1–C_8 alkyl, C_7–C_8 aralkyl, C_5–C_8 cycloalkyl, or C_6–C_8 (cycloalkyl)alkyl; and R_2 and R_3 independently are halo, C_1–C_3 alkyl, C_1–C_3 alkoxy, or di(C_1–C_3 alkyl)amino, with the proviso that at least one of R_2 and R_3 is halo or C_1–C_3 alkyl; and the pharmaceutically-acceptable acid addition salts of basic members thereof.

4,013,655
PRODUCTION OF ALKOXYLATED N-METHYLOL COMPOUNDS

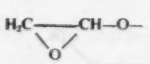
Jürg Merz, Therwil, and Luzius Schibler, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 26, 1973, Ser. No. 344,669
Claims priority, application Switzerland, Mar. 28, 1972, 4632/72
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² C07D 251/64
U.S. Cl. 260—249.6 14 Claims

1. A process for the manufacture of alkoxylated N-methylol compound, which comprises reacting, at a temperature of 10 to 160°C and a pressure of 1 to 20 atmospheres gauge; (a) a N-methylolatedamino triazine with (b) an alkylene oxide of the formula



wherein R is hydrogen, alkyl with 1 to 3 carbon atoms, phenyl or a



radical, in the presence of (c) at least one metal alcoholate of the formula

$$Me(O—X)_r(Q)_{n-r}$$

wherein Me is a n-valent transition metal of groups IV, V or VI of the periodic system, X is alkyl with 1 to 4 carbon atoms, halogenoalkyl with 2 to 4 carbon atoms, phenyl, benzyl or

cycloalkyl with at most 12 ring carbon atoms, Q is halogen or alkoxy with 1 to 4 carbon atoms, r is 1 to *n* and *n* is 4, 5, or 6, or in the presence of said component (c) together with (d) at least one alkali metal hydroxide or one alkali metal alcoholate of an alkanol with 1 to 4 carbon atoms.

4,013,656

PROCESS FOR THE PREPARATION OF PYRIDYLAMINO-METHYLENEMALONIC ACID DERIVATIVES

Otto Ackermann, Troisdorf-Sieglar, Germany; Otto Bleh, deceased, late of Troisdorf-Bergheim, Germany (by Rita Bleh), and Dieter Morgenstern, Troisdorf, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

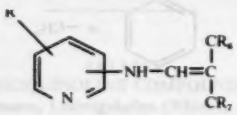
Continuation of Ser. No. 365,815, May 31, 1973, abandoned. This application Oct. 23, 1975, Ser. No. 625,287

Claims priority, application Germany, June 7, 1972, 2227651

Int. Cl.² C07D *213/57, 213/55*

U.S. Cl. 260—294.9 **15 Claims**

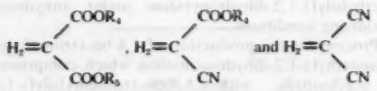
1. A process for preparing a pyridylaminomethylenemalonic acid derivative of the formula:



which comprises reacting together a pyridyl compound of the formula:

an alkoxy compound of the formula;

and a malonic acid derivative of the formulas selected of the groups of



wherein:

R_6 and R_7 and the groups OOR_4 or OOR_5 or = N

R is hydrogen or unsubstituted C_1–C_4 alkyl radical;

R_1, R_2 and R_3 are each independently methoxy or ethoxy substituted or unsubstituted C_1–C_2 alkyl radicals;

R_4 and R_5 are each independently methoxy or ethoxy substituted or unsubstituted C_1–C_8 alkyl radicals

at a temperature of 60 to 160° C.

4,013,657

O-ETHYL-S-n-PROPYL-O-[PYRIDAZ-(6)-ON-(3)-YL]-THIONOTHIOLPHOSPHORIC ACID ESTERS

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel; Lothar Rohe, all of Wuppertal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 16, 1974, Ser. No. 498,288

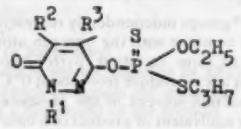
Claims priority, application Germany, Aug. 30, 1973, 2343741

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07F *9/40*

U.S. Cl. 260—250 P **6 Claims**

1. An O-ethyl-S-n-propyl-O-[pyridaz-(6)-on-(3)-yl]-thionothiolphosphoric acid ester of the formula



in which

R^1 is hydrogen, alkyl with 1 to 6 carbon atoms, or alkyl with 1 to 6 carbon atoms carrying a substituent selected from nitrile, halogen, alkoxycarbonyl, alkylcarbonyl, alkoxy and alkylthio, in each case with 1 to 4 carbon atoms in the alkyl moiety; methyl substituted by pyrrolidine, piperidine or thiophene-1,1-dioxide; alkenyl or alkynyl with 2 to 6 carbon atoms; phenyl or phenyl carrying one substituent selected from halogen, alkyl with 1 to 4 carbon atoms, nitro, nitrile, alkoxy and alkylthio, each with 1 or 2 carbon atoms and 2 to 5 halogen atoms; pyrrolidine, piperidine or thiophene-1,1-dioxide, and

R^2 and R^3 each independently is hydrogen or alkyl with 1 to 4 carbon atoms, or together are $(CH)_4$ forming a fused benzene ring with the adjoining carbon atoms.

4,013,658

SYNTHESIS OF 3,5-DIPHENYL-4(1H)-PYRIDAZINONES

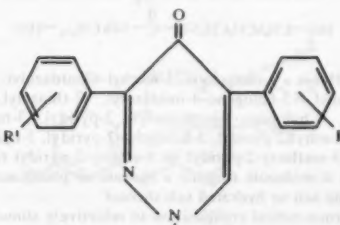
Riaz F. Abdulla, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 3, 1975, Ser. No. 593,094

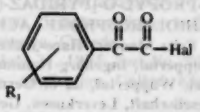
Int. Cl.² C07D *237/14*

U.S. Cl. 260—250 A **4 Claims**

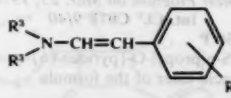
1. A process for making compounds of the formula



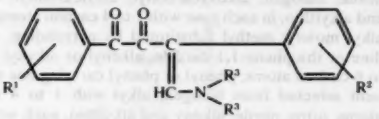
wherein R represents hydrogen or C_1–C_3 alkyl, and R^1 and R^2 independently represent trifluoromethyl, hydrogen, fluoro, chloro, bromo or methyl, which process comprises contacting a glyoxyloyl halide of the formula



wherein Hal represents fluoro, chloro or bromo, with a styrylamine of the formula



wherein the R^3 groups independently represent C_1–C_3 alkyl, or the R^3 groups combine with the nitrogen atom to which they are attached to form azetidino, pyrrolidino, piperidino, or morpholino, at a temperature from about 0° C. to about 40° C. in an inert reaction solvent in the presence of at least one equivalent per equivalent of product of a base chosen from the group consisting of tertiary amines and alkali metal carbonates and hydroxides to form an enaminoketone of the formula



and contacting the enaminoketone with a hydrazine of the formula $R—NHNH_2$, or a hydrate or hydrohalide thereof, at a temperature from about 0° C. to about 40° C. in a second inert reaction solvent.

4,013,659

CERTAIN N,N'-DISUBSTITUTED GUANIDINE COMPOUNDS AND THEIR USE

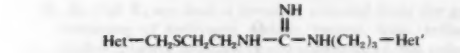
Graham John Durant; Charon Robin Ganellin, both of Welwyn Garden City, and Michael Edward Parsons, St. Albans, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Continuation-in-part of Ser. No. 481,716, June 21, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,526

Int. Cl.² C07D *403/00, 417/00*

U.S. Cl. 424—263 **7 Claims**

1. A compound of the formula



wherein Het is a 4-imidazolyl, 5-methyl-4-imidazolyl, 5-ethyl-4-imidazolyl, 5-halogeno-4-imidazolyl, 2-thiazolyl, 3-isothiazolyl, 4-halogeno-3-isothiazolyl, 2-pyridyl, 3-methyl-2-pyridyl, 3-ethyl-2-pyridyl, 3-halogeno-2-pyridyl, 3-hydroxy-2-pyridyl, 3-methoxy-2-pyridyl or 3-ethoxy-2-pyridyl ring, and Het' is a 4-imidazole ring; or a hydrate or pharmaceutically acceptable salt or hydrated salt thereof.

5. pharmaceutical composition to selectively stimulate histamine H_2-receptors comprising an effective amount to stimulate said receptors of a compound of claim 1 in combination with a pharmaceutically acceptable diluent or carrier.

6. A method of selectively stimulating histamine H_2-receptors which comprises administering a compound of claim 1 parenterally to an animal in an amount sufficient to stimulate said receptors.

4,013,660

INDOLOBENZOXAZEPINES

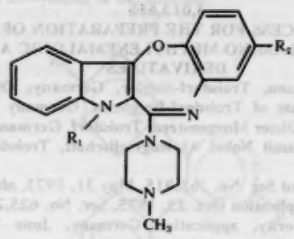
Richard E. Brown, Hanover, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 30, 1975, Ser. No. 627,159

Int. Cl.² C07D *413/14*

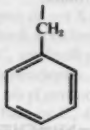
U.S. Cl. 260—268 PC **4 Claims**

1. A compound of the general formula:



I

wherein R_1 is:



, or $—CH_3$;

R_2 is -Cl.

4,013,661

SUBSTITUTED 1,2-DIHYDROPYRIDINES AND PROCESS FOR PREPARING SAME

Reinhard A. Sulzbach, Burghausen, Germany, and Abul F. M. Iqbal, Glattbrugg, Switzerland, assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 153,062, June 11, 1971, Pat. No. 3,816,439. This application Apr. 17, 1974, Ser. No. 461,685

Claims priority, application Switzerland, June 19, 1970, 9393/70

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C07D *215/58, 211/92*

U.S. Cl. 260—283 CN **5 Claims**

1. Process for the production of 1,4-bis-(trimethylsilyl-2-(1-carbomethoxyethyl)-1,2-dihydropyridine which comprises reacting acrylic acid methyl ester with 1,4-bis-(trimethylsilyl)-1,4-dihydropyridine under anhydrous and nonoxidizing conditions.

2. Process for the production of 1,4-bis-(trimethylsilyl)-2-(1-cyanoethyl)-1,2,3,6-tetrahydropyridine-3,6-endo-2-cyanoethylene which comprises reacting acrylonitrile with 1,4-bis-(trimethylsilyl)-1,2-dihydropyridine under anhydrous and nonoxidizing conditions.

3. Process for the production of 1,4-bis-(trimethylsilyl)-2-(1-cyanoethyl)-1,2-dihydroquinoline which comprises reacting acrylonitrile with 1,4-bis-(trimethylsilyl)-1,4-dihydroquinoline under anhydrous and nonoxidizing conditions.

4. Process for the production of 1-(2,6-dichlorobenzyl)-2-(1-cyanoethyl)-1,2-dihydropyridine which comprises reacting acrylonitrile with 1-(2,6-dichlorobenzyl)-1,4-dihydropyridine under anhydrous and nonoxidizing conditions.

5. Process for the production of 1-phenyl-2-(1-cyanoethyl)-1,2-dihydropyridine which comprises reacting acrylonitrile with 1-phenyl-1,4-dihydropyridine under anhydrous and nonoxidizing conditions.

4,013,662
ALKYL AND BENZYL 6,7-DIALKOXY-2-METHYL-4-OXO-1,2,3,4-TETRAHYDROQUINOLINE-1-CARBOXYLATES

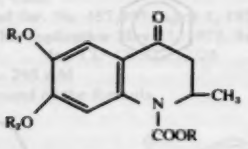
Charles A. Harbert, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 534,659, Dec. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 428,441, Dec. 26, 1973, abandoned. This application Nov. 4, 1975, Ser. No. 628,809

Int. Cl.² C07D *215/22*

U.S. Cl. 260—287 K 8 Claims

1. The racemic mixture of a compound of the formula



wherein R is selected from the group consisting of alkyl having from one to four carbon atoms and benzyl; and R_1 and R_2 are each alkyl having from one to four carbon atoms.

4,013,663
ISOQUINOLINE COMPOUNDS

Albert Westermann, Ludwigshafen (Rhine); Frank Zimmermann, Neustadt-Haardt; Dirk Wuppermann, Freinsheim; Ludwig Friedrich, Bruehl, and Manfred Raschack, Weisenheim am Sand, all of Germany, assignors to Knoll A.G. Chemische Fabriken, Ludwigshafen (Rhine), Germany

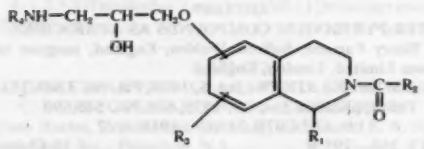
Filed Oct. 30, 1975, Ser. No. 627,291

Claims priority, application Germany, Nov. 15, 1974, 2454198; Apr. 30, 1975, 2519163

Int. Cl.² C07D *217/04*

U.S. Cl. 260—287 D 27 Claims

1. An isoquinoline compound of the formula



and salts thereof with physiologically tolerable acids, wherein R_1 is hydrogen or methyl, R_2 is hydrogen or lower alkyl, R_3 is hydrogen or methoxy, and R_4 is isopropyl or tertiary butyl.

4,013,664
SYNTHESIS OF HERNANDALINE

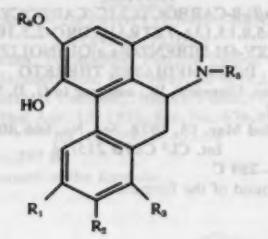
S. Morris Kupchan, Charlottesville, Va., and Venkataraman Kameswaran, Levittown, Pa., assignors to Research Corporation, New York, N.Y.

Filed June 20, 1973, Ser. No. 371,814

Int. Cl.² C07D *217/04*

U.S. Cl. 260—288 D 10 Claims

1. A method of synthesizing an aporphine of the formula



wherein

R_1 and R_3 are hydrogen, lower alkyl, lower alkoxy or phenoxy,

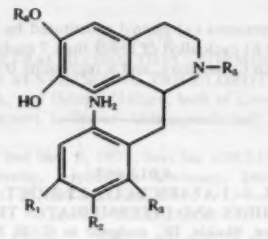
R_2 is hydrogen, halo, lower alkyl, lower alkoxy, or polylower alkoxy phenoxy,

R_5 is lower alkyl,

R_6 is hydrogen or lower alkyl,

wherein the prefix lower alk. signifies an alkyl moiety of 1–5 carbon atoms, which comprises the sequential steps of:

a. diazotizing a compound of the formula



and

treating the thus produced diazonium salt with copper powder.

4,013,665
ANTIVIRAL, SUBSTITUTED 1,3-DIMETHYL-1H-PYRAZOLO(3,4b)QUINOLINES

Ronnie Ray Crenshaw, Dewitt; George Michael Luke, Lafayette, and Paul Siminoff, Dewitt, all of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

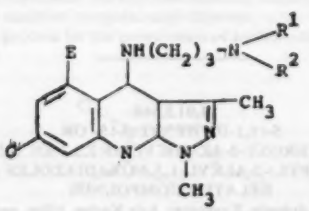
Filed Oct. 1, 1973, Ser. No. 402,657

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976

Int. Cl.² C07D *215/46, 215/20*

U.S. Cl. 260—288 CF 4 Claims

1. A compound corresponding to the formula



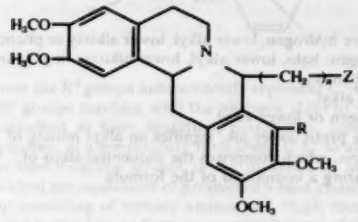
wherein E is hydrogen or lower alkoxy of 1 to 3 carbon atoms, G is lower alkyl or lower alkoxy of 1 to 3 carbon atoms, R^1 and R^2 are alike or different and each is lower alkyl of 1 to 5 carbon atoms; or a pharmaceutically acceptable salt thereof.

4,013,666
(8α,13aβ)-8-CARBOCYCLIC/CARBOCYCLIC METHYL-5,8,13,13A-TETRAHYDRO-2,3,10,11-TETRAMETHOXY-6H-DIBENZO[a,g]QUINOLIZINES AND INTERMEDIATES THERETO

George R. Lenz, Glenview, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 15, 1976, Ser. No. 666,802
Int. Cl.² C07D 215/14
U.S. Cl. 260—289 C 9 Claims

1. A compound of the formula



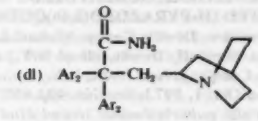
wherein Z represents (a) phenyl substituted by fewer than 4 methoxys or (b) cycloalkyl of fewer than 7 carbons, R represents hydrogen or methoxy, and *n* represents 0 or 1.

4,013,667
2,2-DIARYL-3-(1-AZABICYCLO[2.2.2]OCT-2-YL)PROPIONAMIDES AND INTERMEDIATES THERETO

Chung H. Yen, Skokie, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 664,723
Int. Cl.² C07D 453/02
U.S. Cl. 260—293.53 3 Claims

1. A compound of the general formula



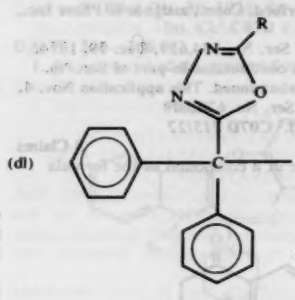
wherein Ar_1 and Ar_2 are independently selected from the group consisting of phenyl, monosubstituted halophenyl and monosubstituted lower alkylphenyl wherein the lower alkyl radicals contain 1 to 6 carbon atoms, and may be alike or different.

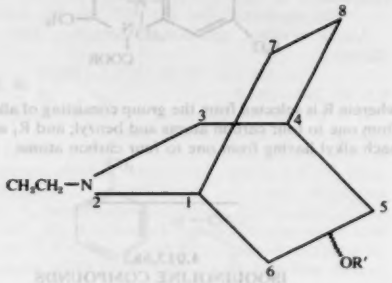
4,013,668
5-(1,1-DIPHENYL-3-(5- OR 6-HYDROXY-2-AZABICYCLO(2.2.2)OCT-2-YL)PROPYL)-2-ALKYL-1,3,4-OXADIAZOLES AND RELATED COMPOUNDS

Gilbert W. Adelstein, Evanston; Aziz Karim, Niles, and Chung H. Yen, Skokie, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 10, 1976, Ser. No. 665,609
Int. Cl.² C07D 413/06
U.S. Cl. 260—293.54 10 Claims

1. A compound of the formula





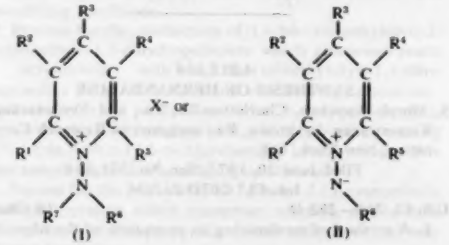
wherein R is lower alkyl containing from 1 to 6 carbon atoms; R′ is hydrogen or a lower alkanoyl containing from 2 to 7 carbon atoms; and OR′ is attached at the 5- or 6-position in either the endo or exo configuration.

4,013,669
ESTER-PYRIDINIUM COMPOUNDS AS ACARICIDES

John Henry Parsons, Saffron Walden, England, assignor to Fisons Limited, London, England

Division of Ser. No. 321,476, Jan. 5, 1973, Pat. No. 3,886,171. This application Jan. 30, 1975, Ser. No. 545,698
Int. Cl.² C07D 213/02; A01N 9/22
U.S. Cl. 260—295 R 10 Claims

1. A compound of the general formula



wherein

R^1, R^2, R^3, R^4 and R^5 are the same or different and each represents hydrogen or alkyl of 1 to 4 carbon atoms;

R^6 represents a group of formula $COOR^{11}$ wherein R^{11} represents phenyl; phenyl substituted by halogen and/or alkyl of 1 of 4 carbon atoms; or benzofuryl;

R^7 represents hydrogen, alkyl of 1 to 4 carbon atoms or benzoyl substituted by halogen; and

X^- represents one equivalent of an anion.

4,013,670

DERIVATIVES OF PYRROLIDINE AND PIPERIDINE

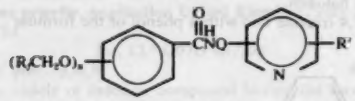
Elden H. Banitt, Woodbury, and William R. Bronn, St. Paul, both of Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 457,099, April 1, 1974, Pat. No. 3,900,481. This application May 27, 1975, Ser. No. 580,890

Int. Cl.² C07D *213/26*

U.S. Cl. 260—295 AM **8 Claims**

1. A compound of the formula



wherein R_f is a perfluoroalkyl radical containing from one to three carbon atoms, n is one to three, Q is a carbon-nitrogen bond, methylene or methylmethylene and R′ is hydrogen, methyl or ethyl.

4,013,671

SUBSTITUTED BENZOPYRANO[3,4-c]PYRIDINES AND PROCESS FOR THEIR PREPARATION

Richard E. Brown, Hanover, and John Shavel, Jr., Mendham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 538,424, Jan. 3, 1975, Pat. No. 3,961,057, which is a division of Ser. No. 343,613, March 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 122,498, March 9, 1971, abandoned. This application Mar. 15, 1976, Ser. No. 666,829

Int. Cl.² C07D *311/06, 311/76*

U.S. Cl. 260—295 T **3 Claims**

1. 1,2,3,4-Tetrahydro-8-methoxy-5H-[1]benzopyrano-[3,4-c]pyridin-5-one.

4,013,672

2,5,7,8-TETRAHYDRO-1,2,4,5,6-PENTAAZABENZO[6,7]-CYCLOHEPTA[1,2,3-CD]-AS-INDACENES

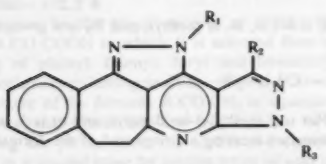
Hans Hoehn, Tegernheim, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 15, 1976, Ser. No. 666,540

Int. Cl.² C07D *471/14*

U.S. Cl. 260—296 P **10 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, lower alkyl or hydroxy-lower alkyl; R_2 and R_3 each is hydrogen, lower alkyl or phenyl;

and acid addition salts thereof.

4,013,673

2,3-DIHYDRO-3-(2-PYRIDINYL)-4H-1-BENZOPYRAN-4-ONE N-OXIDES

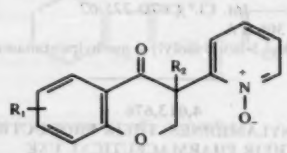
David T. Connor, Parsippany; Patricia Young, Madison, and Max Von Strandtmann, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Apr. 13, 1976, Ser. No. 676,441

Int. Cl.² C07D *405/04*

U.S. Cl. 260—297 B **5 Claims**

1. A compound of the formula:



I

wherein R_1 is hydrogen, halogen, lower alkyl of 1–6 carbon atoms, hydroxy, lower alkoxy of 1–6 carbon atoms or amino and R_2 is hydrogen or $—CH_2OH$.

4,013,674

N-(1,2,2,2-TETRACHLOROETHYL)-FORMIMIDE-CHLORIDE FOR SYNTHESIZING TRICHLOROTHIAZOLE

Gunther Beck, and Helmut Heitzer, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

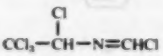
Filed Dec. 9, 1975, Ser. No. 639,137

Claims priority, application Germany, Dec. 12, 1974, 2458827; Dec. 12, 1974, 2458825

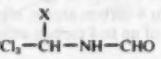
Int. Cl.² C07D *263/30*

U.S. Cl. 260—302 R **15 Claims**

1. N-(1,2,2,2-tetrachloroethyl)-formimide-chloride of the formula



2. A process for the preparation of N-(1,2,2,2-tetrachloroethyl)-formimide-chloride according to claim 1, comprising contacting a formamide of the formula

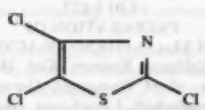


wherein

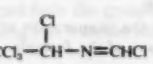
X is OH or Cl,

with approximately the stoichiometrically required amount of a highly reactive inorganic acid chloride.

11. A process for the preparation of trichlorothiazole of the formula



comprising reacting N-(1,2,2,2-tetrachloroethyl)-formimide-chloride of the formula



with sulfur in the temperature range from 150° to 250° C.

4,013,675

N-(3-METHYL-5-ISOTHIAZOLYL)-2-METHYLPENTANAMIDE

Joseph Deli, Rockford, Ill., and Henry C. Stevens, Akron, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 5, 1975, Ser. No. 574,792

Int. Cl.² C07D *275/02*

U.S. Cl. 260—306.8 A **1 Claim**

1. N-(3-methyl-5-isothiazolyl)-2-methylpentanamide.

4,013,676

AMINOPHENYLAMIDINES, THEIR PRODUCTION AND THEIR PHARMACEUTICAL USE

Hartmund Wollweber, Wuppertal-Elberfeld, Germany, and Winfried Flucke, Beenleigh, Australia, assignors to Bayer Aktiengesellschaft, Germany

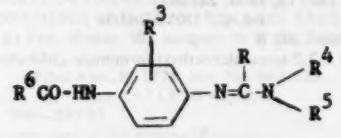
Division of Ser. No. 398,692, Sept. 19, 1973, Pat. No. 3,911,010, which is a division of Ser. No. 151,581, June 9, 1971, Pat. No. 3,818,070. This application May 22, 1975, Ser. No. 579,916

Claims priority, application Germany, June 13, 1970, 2029298

Int. Cl.² 260 *302 D*; **C07D** *261/18*

U.S. Cl. 260—307 H **4 Claims**

1. A compound selected from the group consisting of an aminophenylamidine and the physiologically acceptable acid addition salts thereof, said aminophenylamidine having the formula:



wherein

R is alkyl of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms or cycloalkyl of 3 to 7 carbon atoms;

R^3 is hydrogen, chloro, fluoro, bromo, cyano, trifluoromethyl, alkyl of up to 4 carbon atoms, alkoxy of up to 4 carbon atoms or alkenyl of up to 4 carbon atoms;

R^4 is alkyl of up to 4 carbon atoms, alkenyl of up to 4 carbon atoms, alkynyl of up to 4 carbon atoms or alkoxy of up to 4 carbon atoms;

R^5 is alkyl of up to 5 carbon atoms, alkenyl of up to 4 carbon atoms, or cycloalkyl of 3 to 7 carbon atoms; and

R^6 is isoxazolyl unsubstituted or substituted by alkyl of up to 4 carbon atoms.

4. The compound according to claim 1 which is N-[4-(5-methylisoxazol-3-ylcarbonylamino)-phenyl]-N′,N′-dimethylacetamidine.

4,013,677

PREPARATION OF 1,2,4-TRIAZOLYL-(1)-PHENOXY-ACYL-METHANES

Claus Stoizer; Wolfgang Kramer; Karl Heinz Büchel, and Werner Meiser, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

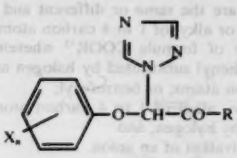
Filed Feb. 5, 1975, Ser. No. 547,429

Claims priority, application Germany, Feb. 12, 1974, 2406665

Int. Cl.² C07D *249/08*

U.S. Cl. 260—308 R **10 Claims**

1. A process for the preparation of a 1,2,4-triazolyl-(1)-phenoxy-acyl-methane of the formula



in which

R is alkyl with 1 to 4 carbon atoms or phenyl,

each X independently is alkyl with 1 to 4 carbon atoms, halogen, alkoxycarbonyl with 1 or 2 carbon atoms in the alkoxy, nitrile, phenyl or nitro, and

n is an integer from 0 to 5,

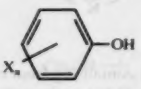
comprising reacting a dihaloketone of the formula

$$(Hal)_2CH—CO—R$$

in which

Hal is halogen,

with 1,2,4-triazole and with a phenol of the formula



in the presence of an acid-binding agent selected from the group consisting of alkali metal and alkaline earth metal hydroxides and carbonates and tertiary amines and a polar organic solvent as diluent, at a temperature of about 0° to 150° C.

4,013,678

PROCESS FOR PREPARING HETEROCYCLICALKYLTHIOALKYL-N-CYANOGUANIDINES

Thomas Henry Brown; Graham John Durant, both of Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

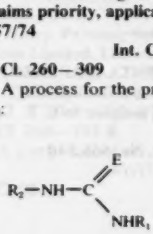
Filed Aug. 20, 1975, Ser. No. 606,269

Claims priority, application United Kingdom, Sept. 2, 1974, 38257/74

Int. Cl.² C07D *233/18*

U.S. Cl. 260—309 **3 Claims**

1. A process for the production of a compound of the formula:



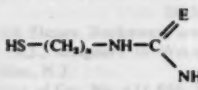
wherein E is NCN, R_1 is methyl, and R_2 is a grouping of the structure

$$Het — (CH_2)_m — S — (CH_2)_n —$$

wherein Het is 5-methyl-4-imidazolyl; and *m* is 1, and *n* is 2; which comprises treating a compound of the formula

$$Het — (CH_2)_m — Z$$

wherein Het and *m* are as defined hereinabove and Z is halogen, which forms a good leaving group, with a mercaptan of the formula



wherein n, E and R_1 are as defined hereinabove, in the presence of a base, said reactants and base being present in molar equivalent amounts.

4,013,679

SUBSTITUTED 6,7-DIHYDRO [1,7-ab](1) BENZAZEPINE COMPOUNDS

Mario Riva, Monza (Milan); Luciano Toscano, Milan; Giampiero Grisanti, Milan, and Alberto Bianchetti, Milan, all of Italy, assignors to Pierrel S.p.A., Milan, Italy

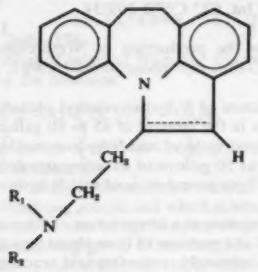
Filed June 30, 1975, Ser. No. 591,763

Claims priority, application United Kingdom, July 3, 1974, 29419/74

Int. Cl.² C07D *487/06*

U.S. Cl. 260—326.9 **9 Claims**

1. An indole or indoline compound having the formula:



I

wherein R_1 and R_2 are the same or different and are hydrogen, methyl or benzyl and the pharmaceutically acceptable acid addition salts thereof.

4,013,680

PROCESS FOR THE PREPARATION OF AROMATIC α-KETO CARBOXYLIC ACIDS

Martin Godfrey Johnson, Rickmansworth; John Peter Turnbull, London, and Harold Alfred Crisp, Harrow Weald, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

Filed June 18, 1975, Ser. No. 587,813

Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 A **7 Claims**

1. A process for the preparation of an α-keto acid of the formula R.CO.COOH in which R is selected from the group consisting of phenyl, thienyl, furyl and benzofuryl, which process comprises oxidizing in a first stage the corresponding methyl ketone of the formula $R.CO.CH_3$ in aqueous solution with an inorganic nitrite salt and hydrochloric or sulphuric acid, raising the pH to about 1.5 to 2.5 and completing the oxidation in a second stage by adding more of said nitrite salt to the reaction mixture, said process being carried out at a temperature of 40°–100° C with from 2–3 moles nitrite salt per mole ketone being added in said first stage and from 1.5–2.5 moles nitrite salt per mole of ketone being added in said second stage.

4,013,681

DERIVATIVES OF THIOPHENE

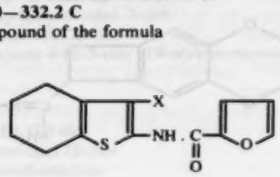
Joseph V. Karabinos, Orange, Conn., and Louis G. Nickell, Honolulu, Hawaii, assignors to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Filed June 23, 1975, Ser. No. 589,401

Int. Cl.² C07D *333/24*

U.S. Cl. 260—332.2 C **3 Claims**

1. A compound of the formula



wherein X is cyano or C_1 –C_4 carboalkoxy.

4,013,682

N-HYDROXY-AMIDINE COMPOUNDS

Harm Jan Panneman, Oss, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

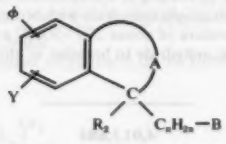
Continuation-in-part of Ser. No. 488,648, July 15, 1974, Pat. No. 3,978,126. This application May 24, 1976, Ser. No. 689,301

Claims priority, application Netherlands, Aug. 3, 1973, 7310741

Int. Cl.² C07D *317/44*

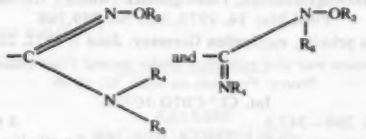
U.S. Cl. 260—340.5 **4 Claims**

1. A compound of the formula:



in which

B is N-hydroxy-amidino of the group consisting of



A is selected from the group consisting of methylene, lower alkyl-substituted methylene, ethylene, lower alkyl substituted ethylene, propylene and lower alkyl substituted propylene, said lower alkyl containing from 1 to 6 carbon atoms;

Q and Y together form an alkylenedioxy group, in which the alkylene group has 1 to 4 carbon atoms;

C_nH_{2n} is alkylene containing 1 to 4 carbon atoms or a single bond,

R_2 is selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, aryl and phenylalkyl the alkyl group of which contains 1 to 4 carbon atoms;

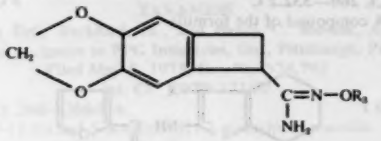
R_3 is selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, phenylalkyl the alkyl group of which contains 1 to 4 carbon atoms, and acyl derived from an organic carboxylic acid containing 1 to 18 carbon atoms;

R_4 and R_5 are selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms and phenylalkyl the alkyl group of which contains 1 to 4 carbon atoms;

R_4 is selected from the group consisting of hydrogen, alkyl containing 1 to 6 carbon atoms, phenyl, methylphenyl, benzyl and methylbenzyl;

and the pharmaceutically acceptable acid addition salts thereof.

4. A compound of the formula:



in which

R_5 is selected from carbamoyl, N-methylcarbamoyl and N,N-dimethylcarbamoyl

and the pharmaceutically acceptable acid addition salts thereof.

4,013,683
PROCESS FOR MAKING β-BROMOCITRACONIC ANHYDRIDE

R. Garth Pews, and Ralph A. Davis, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 12, 1973, Ser. No. 369,373

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07D 307/60

U.S. Cl. 260—346.8 R 9 Claims

1. The process of making β-bromocitraconic anhydride by the reaction of citraconic anhydride with bromine in the vapor phase at a temperature of about 200°–500°C and with a molar ratio of citraconic anhydride to bromine of about 1:1 to about 4:1.

4,013,684
PREPARATION OF 2,5-DIMETHYLFURAN-3-CARBOXYLIC AMIDES

Hans Rupert Merkle, Ludwigshafen, and Hardo Siegel, Speyer, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed May 14, 1973, Ser. No. 359,768

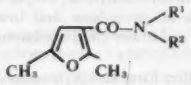
Claims priority, application Germany, June 7, 1972, 2227547

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

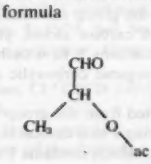
Int. Cl.² C07D 307/66

U.S. Cl. 260—347.3 4 Claims

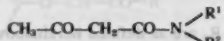
1. A process for the production of a 2,5-dimethylfurancarboxylic amide of the formula



where R^1 and R^2 are identical or different and each denotes hydrogen, phenyl, substituted phenyl, cycloalkyl, substituted cyclohexyl, alkenyl, cycloalkenyl, alkynyl, bicycloalkyl or alkyl of 1 to 4 carbon atoms, wherein an α-acyloxypropionaldehyde of the formula



where ac denotes formyl, acetyl, propionyl, butyryl or isobutyryl, is reacted with an acetoacetamide of the formula



where R^1 and R^2 have the above meanings, in the presence of 0.005 to 25% by weight, with reference to the α-acyloxypropionaldehyde, of an acid catalyst selected from the group consisting of sulfuric acid and p-toluenesulfonic acid.

4,013,685
PROCESS FOR THE MANUFACTURE OF N(MERCAPTOMETHYL) PHTHALIMIDE S-(O,O-DIMETHYL PHOSPHORODITHIOATE

Shen Fu Liang, El Cerrito, and Richard Alan Zeleny, Lafayette, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 10, 1975, Ser. No. 557,002

Int. Cl.² C07D 209/34

U.S. Cl. 260—326 E 12 Claims

2. A process for the production of N(mercaptomethyl) phthalimide S-(O,O-dimethyl phosphorodithioate), comprising the steps of:

a. Forming a mixture of N-hydroxymethyl phthalimide, an organic solvent in the amount of 45 to 80 gallons of said solvent per pound-mole of said N-hydroxymethyl phthalimide, and 25 to 50 gallons of an aqueous solution of 35 to 40 wt.% HCl per pound-mole of said N-hydroxymethyl phthalimide;

b. reacting said mixture at a temperature of from about 45° to about 75° C at a pressure of from about 0 psig to about 50 psig which intimately contacting said reacting mixture with anhydrous HCl at a rate of from approximately 15 to approximately 65 pounds HCl per hour per pound-mole of N-hydroxymethyl phthalimide used to form the mixture in step (a), to maintain the concentration of said aqueous HCl at 35 to 40 wt.%, to form N-chloromethyl phthalimide in a first aqueous-organic mixture;

c. separating the organic phase having the N-chloromethyl phthalimide dissolved therein from said first aqueous-organic mixture;

d. forming a second mixture of said separated organic phase having the N-chloromethyl phthalimide dissolved therein from step (c) and an additional quantity of organic solvent such that the total of the quantities of said solvent added in this step and in step (a) amount to 80 to 130 gallons of said solvent per pound-mole N-hydroxymethyl phthalimide used to form the mixture in step (a), a sodium O,O-dimethyl dithiophosphate in a molar quantity equal to from 110 to about 150% of the molar quantity of N-hydroxymethyl phthalimide used to form the mixture in step (a);

e. reacting said second mixture at a temperature of from about 45° to about 70° C at a pressure ranging from ambient to about 10 psig, to form N(mercaptomethyl) phthalimide S-(O,O-dimethyl phosphorodithioate) in a second aqueous-organic mixture;

f. separating the organic phase having the N(mercaptomethyl) phthalimide S-(O,O-dimethyl phosphorodithioate) dissolved therein from said second aqueous-organic mixture; and

g. recovering the N(mercaptomethyl) phthalimide S-(O,O-dimethyl) phosphorodithioate) from said organic phase.

4,013,686
4-(1-PYRROLIDINYL)-2H-1-BENZOTHIOPYRAN-1,1-DIOXIDE

Harold Zinnes, Rockaway, and Neil A. Lindo, Chatham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 421,556, Dec. 4, 1973, abandoned, which is a division of Ser. No. 243,523, April 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 163,076, July 15, 1971, abandoned. This application Dec. 6, 1974, Ser. No. 530,254

Int. Cl.² C07D 409/04

U.S. Cl. 260—326.84 1 Claim

1. 4-(1-pyrrolidinyl)-2H-1-benzothiopyran-1,1-dioxide.

4,013,687
ANTHRAQUINONE DISPERSING AGENTS

Hugh Patrick Dryhurst Paget; Leslie Richard Rogers; James Kenneth Davenport Royle; James Frederick Stansfield, and Arthur Topham, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 432,989, Jan. 14, 1974, abandoned, which is a continuation-in-part of Ser. No. 219,843, Jan. 21, 1972, abandoned. This application Dec. 10, 1974, Ser. No. 531,370

Claims priority, application United Kingdom, Feb. 11, 1971, 4445/71

Int. Cl.² C09B 1/16, 1/503

U.S. Cl. 260—376 4 Claims

1. A dyestuff selected from the classes of dyestuff represented by the formulae

$$D\left[Z-O-\left(OC-X-O\right)_n H\right]_n$$

$$D\left[Z-O-\left(OC-X-O\right)_{n-1}COT\right]_n$$

or mixtures thereof

wherein D is an anthraquinone radical which is free from water solubilising groups and which is attached to Z through a carbon atom on one of the benzene rings present in D; n is 1 to 4; Z is a linking group of the formula $-B)_m A-$ wherein B is —NH—, $-SO_2NH-$ or —CO—NH—, m is 0 or 1 and A is alkylene or β-hydroxy-alkylene containing up to 20 carbon atoms or monocyclic arylene-lower-alkylene, X is alkylene or alkenylene containing from 8 to 20 carbon atoms with at least 4 carbon atoms between the —CO— and —O— groups, T is alkyl or alkenyl containing from 8 to 20 carbon atoms and y is a positive integer between 2 and 20.

4,013,688
RADIOIMMUNOASSAY AGENTS

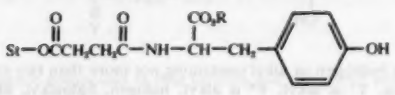
John C. Babcock, and J. Allan Campbell, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Dec. 20, 1972, Ser. No. 316,974

Int. Cl.² C07J 5/00

U.S. Cl. 260—397.45 1 Claim

1. A compound having the following structural formula



wherein St is a steroid moiety linked through the 11-carbon atom and selected from the group consisting of those moieties corresponding to

20α-hydroxypregn-4-en-3-one
20β-hydroxypregn-4-en-3-one
17α-hydroxypregn-4-ene-3,20-dione
21-hydroxypregn-4-ene-3,20-dione
17α,21-dihydroxypregn-4-ene-3,20-dione
17β-hydroxyandrost-4-en-3-one (testosterone)
17β-hydroxy-5α-androstan-3-one
17β-hydroxy-5β-androstan-3-one
5α-androstane-3β,17β-diol
17β-hydroxyestr-4-en-3-one (19-nortestosterone)
estrone
estradiol
estriol
estr-5-ene-3β,17β-diol
androst-5-ene-3β,17β-diol
dehydroepiandrosterone
pregnenolone
21-hydroxypregnenolone
17α-hydroxypregnenolone
17,21-dihydroxypregnenolone
17β,17α-dimethyl-17-hydroxyandrost-4-en-3-one,

and R is a lower alkyl group containing from 1 to 6 carbon atoms inclusive.

4,013,689
PERFLUORINATED VINYL ETHERS

Thomas Martini, Neuenhain, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

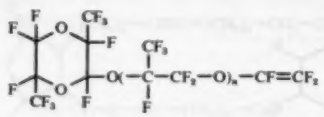
Filed Apr. 16, 1976, Ser. No. 677,513

Claims priority, application Germany, Apr. 19, 1975, 2517357

Int. Cl.² C07D 319/12

U.S. Cl. 260—340.6 1 Claim

1. Perfluorinated vinyl ethers of the formula



wherein n is 0 or 1.

4,013,690
ORGANIC COMPOUNDS

Annemarie Closse, Binningen; Walter Haefliger, Basel, and Daniel Hauser, Binningen, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

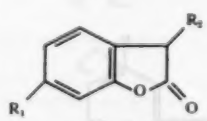
Filed Jan. 30, 1975, Ser. No. 545,331

Claims priority, application Switzerland, Feb. 5, 1974, 1552/74

Int. Cl.² C07D 307/86

U.S. Cl. 260—343.3 R 9 Claims

1. A compound of formula I,



wherein

R_1 is cycloalkyl of 3 to 8 carbon atoms or phenyl, and

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms.

4,013,691

PROCESS FOR THE SIMULTANEOUS MANUFACTURE OF EPSILON-CAPROLACTONES AND CARBOXYLIC ACIDS

Takao Maki, Fujisawa, and Kazuyuki Mineta, Yokohama, both of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

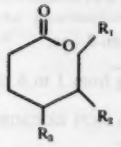
Filed Oct. 8, 1975, Ser. No. 620,755

Claims priority, application Japan, Oct. 23, 1974, 49-122200

Int. Cl.² C07D *313/02*

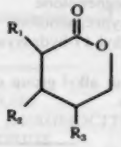
U.S. Cl. 260—343 **14 Claims**

1. In a process for the simultaneous manufacture of epsilon-caprolactones of formula (I),



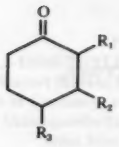
(I),

formula (II)



(II),

or mixtures thereof, wherein R_1 is selected from the group consisting of hydrogen, C_1–C_5 alkyl and halogen; and R_2 and R_3 are selected from the group consisting of hydrogen and C_1–C_5 alkyl, and of carboxylic acids of formula (III), R′—CO_2H (III), wherein R′ is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_1–C_5 alkenyl, C_1–C_{10} formyl-substituted alkyl, phenyl, C_7–C_{12} aralkyl, chloromethyl and furyl, by oxidizing a cyclohexanone of formula (IV),

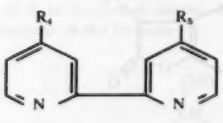


(IV)

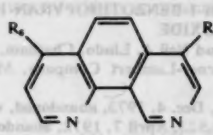
wherein R_1, R_2 and R_3 are as defined above, and an aldehyde of formula (V),

$$R' - CHO, \qquad (V)$$

wherein R′ is as defined above, with molecular oxygen, the improvement which comprises effecting said oxidation in the presence of a soluble compound of a metal selected from the group consisting of iron, palladium, vanadium, chromium, molybdenum, tungsten and cerium, and a compound which has a heterocyclic ring containing at least one nitrogen atom and which acts as a multidantate ligand.1 selected from the group consisting of:

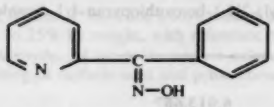


wherein R_4 and R_5 are selected from the group consisting of hydrogen, C_1–C_4 alkyl and C_6–C_{10} aryl;

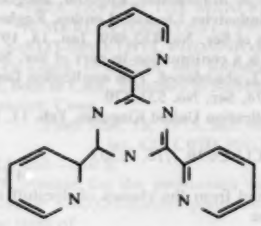


(VII)

wherein R_6 and R_7 are selected from the group consisting of hydrogen C_1–C_4 alkyl, C_6–C_{10} aryl, nitro and halogen;



and



(IX)

4,013,692

CERTAIN 3-PHENYL-BENZOFURAN LOWER ALKANOIC ACIDS AND ESTERS THEREOF

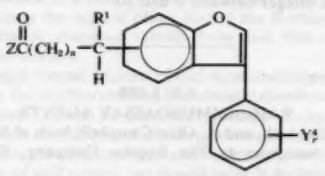
Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Continuation of Ser. No. 516,583, Oct. 21, 1974, abandoned, which is a division of Ser. No. 199,318, Nov. 16, 1971, Pat. No. 3,862,134. This application Nov. 28, 1975, Ser. No. 636,351

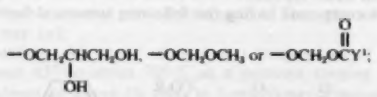
Int. Cl.² C07D *307/20*

U.S. Cl. 260—346.2 R **22 Claims**

1. A compound of the formula



wherein Z is



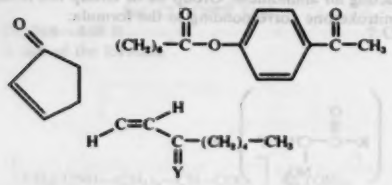
R^1 is hydrogen or alkyl containing not more than two carbon atoms, Y^1 is alkyl, Y^4 is alkyl, halogen, haloalkyl, alkoxy, dialkylamino, alkylthio, alkylsulfonyl, alkylsulfinyl or hydroxyl, each alkyl in Y^1 and Y^4 containing not more than four carbon atoms; n is 0–2; and r is 0–5; and wherein the group containing Z is attached to the 5,6, or 7 position of the benzofuran ring.

4,013,693
SUBSTITUTED PHENYL ESTERS OF PGA,

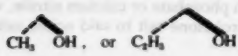
Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 431,600, Jan. 8, 1974, Pat. No. 3,952,088.
This application Apr. 21, 1976, Ser. No. 678,840
Int. Cl.² C07C 177/00
U.S. Cl. 260—390 12 Claims

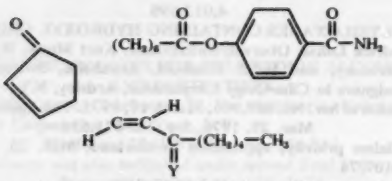
1. An Optically active compound of the formula:



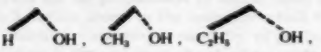
or a racemic compound of that formula and the mirror image thereof, wherein Y is

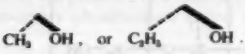


5. An optically active compound of the formula:

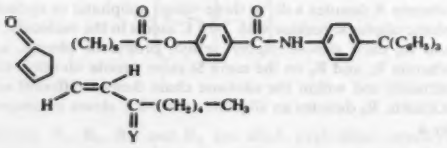


or a racemic compound of that formula and the mirror image thereof, wherein Y is

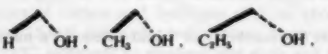




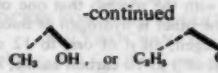
9. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein Y is



-continued



4,013,694
CERIA CATALYZEA CONVERSION OF PHENOLS TO DIBENZOFURANS

Norman A. Fishel, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Aug. 8, 1975, Ser. No. 603,061
Int. Cl.² C07D 307/91
U.S. Cl. 260—346.2 M 13 Claims

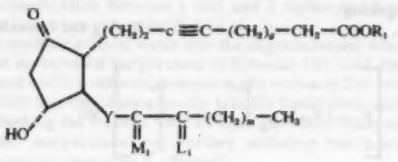
1. Process for the production of a dibenzofuran compound which comprises contacting a phenolic compound feedstock comprising a phenol having an unsubstituted ortho position selected from phenols and polycyclic phenols having no substituents other than alkyl, hydroxy, aryl, aralkyl and alkaryl in the vapor phase at a temperature of 300° to 700° C at a gas hourly space velocity of from 1 hr^{-1} to 2,000 hr^{-1} with a catalyst essentially composed of a member of the class of ceria and combinations of ceria with an oxide of a metal of the group consisting of aluminum, silicon, magnesium, titanium, zirconium, hafnium, calcium, potassium, sodium, lanthanum, neodymium, praseodymium, samarium, thorium, and uranium and mixtures thereof

4,013,695
4,4,5,5-TETRADEHYDRO-PGE, ANALOGS

Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 2, 1975, Ser. No. 619,077
Int. Cl.² C07C 177/00
U.S. Cl. 260—410.9 R 32 Claims

1. A prostaglandin analog of the formula



wherein g is one, 2, or 3;
wherein Y is trans—CH=CH—;
wherein M_1 is

wherein R_5 is hydrogen or methyl;
wherein m is one to 5, inclusive;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the

same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; and wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,013,696

ELEMENT COMPRISING A COATING LAYER CONTAINING A MIXTURE OF A CATIONIC PERFLUORINATED ALKYL AND AN ALKYLPHENOXY-POLY(PROPYLENE OXIDE)

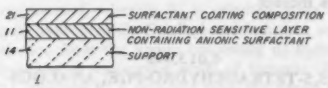
John M. Babbitt, E. Rochester, and James F. Houle, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 382,618, July 25, 1973, Pat. No. 3,850,640, which is a continuation-in-part of Ser. No. 230,450, Feb. 29, 1972, Pat. No. 3,775,126. This application Aug. 28, 1974, Ser. No. 501,379

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

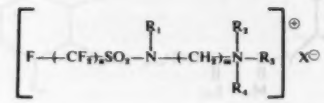
Int. Cl.² G03C 1/76; C09D 3/04

U.S. Cl. 428—412 14 Claims



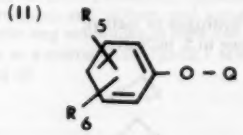
1. An element comprising a support, a layer (a) containing at least one anionic surfactant and contiguous to said layer (a) a layer (b) containing a mixture of at least one cationic surfactant and at least one nonionic surfactant, said layer (b) being farther from said support than is said layer (a); said mixture comprising

A. at least one cationic surfactant having the formula (I):



wherein n is an integer of from 1 to 9, m is an integer of from 1 to 6, R_1 is hydrogen or a lower alkyl group of from 1 to 4 carbon atoms, R_2, R_3 and R_4 are independently selected alkyl groups of from 1 to 6 carbon atoms, and X⁻ is an anionic moiety; and

B. at least one non-ionic surfactant having the formula (II):



wherein R_5 is an alkyl group of from 6 to 18 carbon atoms,

R_6 is hydrogen or an alkyl group of from 1 to 18 carbon atoms and Q is a polyether group comprising from about 3 to 15 units of hydroxypropylene oxide, said polyether group comprising n-propylene and isopropylene moieties;

the weight ratio of said cationic surfactant to said nonionic surfactant in said mixture being from about 2:1 to about 1:75, respectively.

4,013,697

PREPARATION OF CARBOXYLIC ACIDS FROM SALTS OF NITROKETONES

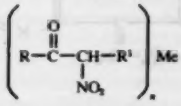
Mahmoud S. Kablaoui, Wappingers Falls, and Richard F. Love, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed June 23, 1975, Ser. No. 589,327

Int. Cl.² C07C 51/00, 53/00, 53/08, 53/22

U.S. Cl. 260—413 12 Claims

1. A method of preparing a carboxylic acid which comprises contacting an ammonium, Group IA or Group IIA metal salt of a nitroketone corresponding to the formula:



where R is an alkyl group of from 1 to 25 carbon atoms, where R^1 is hydrogen or an alkyl group of from 1 to 25 carbon atoms, where Me is NH_4, a Group IA metal or a Group IIA metal and where n is 1 to 2, at a temperature of about 20° to 100° C. with from 10 to 100 parts by weight of water per part by weight of said nitroketone salt in the presence of an acidic mineral acid salt, wherein said acidic salt is ammonium chloride, ammonium nitrate, ammonium sulfate, ammonium hydrogen sulfate, ammonium phosphate or calcium nitrate, where the mole ratio of said nitroketone salt to said acidic salt is from about 1:0.01 to 1:2.

4,013,698

POLYSILOXANES CONTAINING HYDROXYL GROUPS

Friedrich Lohse, Oberwil, Switzerland; Kurt Munk, Wyhlen, Germany, and Heinz Rembold, Arlesheim, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

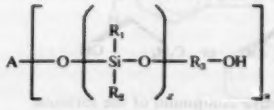
Division of Ser. No. 558,996, March 17, 1975. This application Mar. 29, 1976, Ser. No. 671,636

Claims priority, application Switzerland, Mar. 25, 1974, 004107/74

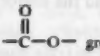
Int. Cl.² C07F 7/18

U.S. Cl. 260—448.8 R 3 Claims

1. A polysiloxane of formula I



wherein A denotes a di- or three-valent apliphatic or cycloaliphatic-aliphatic residue with 2-15 C atoms in the molecule, R_1 and R_2 each denote methyl, ethyl, propyl or phenyl, and wherein R_1 and R_2 on the same Si atom denote identical substituents and within the siloxane chain denote different substituents, R_3 denotes an alkylene with 2-8 C atoms interrupted by a



group,

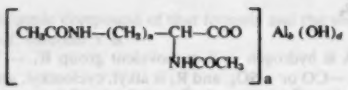
n denotes the number 2 or 3 and x denotes a number from 2 to 20.

4,013,699
ALUMINIUM AND/OR MAGNESIUM SALTS OF AMINO-ACIDS

André Henri Passedouet, Maisons-Laffite, and Robert Pipon, Melle, both of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Aug. 8, 1974, Ser. No. 495,781
Claims priority, application France, Aug. 9, 1973, 73.29163; June 26, 1974, 74.22228
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976
Int. Cl.² C07F 5/06
U.S. Cl. 260—448 R 7 Claims

1. A salt of the formula:



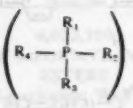
wherein the amino-acid moiety is of the D or L form or a mixture of the D and L forms, *n* represents 3 or 4, *a* represents an integer from 1 through 10, *b* represents an integer from 1 through 9, and *d* represents an integer from 1 through 19, the numbers represented by the indices *a*, *b* and *d* being connected by the relationship $a + d = 3b$.

4,013,700
CATALYTIC PROCESS FOR POLYHYDRIC ALCOHOLS AND DERIVATIVES

James N. Cawse, Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,942
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² C07C 27/06
U.S. Cl. 260—449 R 19 Claims

1. A process for the preparation of alkane diols and triols having 2 to 3 carbon atoms in the molecule which comprises reacting a mixture consisting essentially of hydrogen and oxides of carbon in the presence of a rhodium carbonyl complex and a quaternary phosphonium cation of the general formula



wherein R_1, R_2, R_3, and R_4 are alkyl, cycloalkyl, araalkyl, betahydroxy, ethoxymethyl, ethoxyethyl, phenoxyethyl, oleylmethallyl, allyloxyethyl, or a polyalkylene ether group of the formula $(C_x H_{2x}O)_z$-or wherein n has an average value from 1–4, x has an average value from 2 to about 150 and R is hydrogen or alkyl of 1 to about 12 carbon atoms at a pressure of oxides of carbon and hydrogen of from about 1000 psia to about 15,000 psia and a temperature of about 100°C. to about 375°C. sufficient to produce said diols and triols.

4,013,701
PROCESS FOR THE PRODUCTION OF POLYISOCYANATES

Gert Jabs, Cologne, and Günther Loew, Leichlingen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 8, 1975, Ser. No. 575,849
Claims priority, application Germany, May 22, 1974, 2441843
Int. Cl.² C07C 119/042, 119/045, 119/048
U.S. Cl. 260—453 AR 8 Claims

1. A process for the production of modified polyisocyanates suitable for the production of hydrophilic foams comprising

a. heating an organic polyisocyanate with an organic sulphonic acid containing from 0.1 to 5 percent by weight of water at a temperature of from 40° to 90° C, the isocyanate group to sulphonic acid group molar ratio being from 100:0.1 to 100:50, and

b. stopping the heating thereof once 50 to 100 percent of the carbon dioxide theoretically expected from the reaction of the entire amount of the water with the isocyanate groups has evolved from the reaction mixture.

4,013,702
PROCESS FOR THE PURIFICATION OF POLYCARBONATES

Jean-Pierre L. Cartier, Evry, and Jean-Pierre G. Senet, Vaux le Penil, both of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Dec. 4, 1975, Ser. No. 637,760
Claims priority, application France, Dec. 11, 1974, 74.40836
Int. Cl.² C07C 68/08
U.S. Cl. 260—463 13 Claims

1. A process for purification of an oligocarbonate formed by transesterification between a diol and a diphenylcarbonate, which comprises the steps of

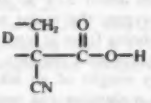
i. introducing liquid water into the oligocarbonate which is at an elevated temperature of between 150° and 200° C and under a reduced pressure not in excess of 250 mm Hg such that the oligocarbonate is in the liquid state, and (ii) flushing the mixture with an inert gas whilst maintaining the temperature and further reducing the pressure whereby degassing is effected.

4,013,703
CYANOACRYLIC ACID ADDUCTS

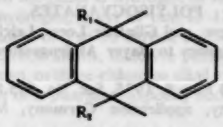
Carl J. Buck, Berkeley Heights, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 512,276, Oct. 4, 1974, Pat. No. 3,975,422, which is a continuation-in-part of Ser. Nos. 308,375, Nov. 21, 1972, abandoned, and Ser. No. 308,376, Nov. 21, 1972, abandoned. This application Nov. 18, 1975, Ser. No. 633,143
Int. Cl.² C07C 121/46, 121/66
U.S. Cl. 260—464 1 Claim

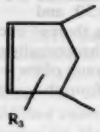
1. As a new composition of matter a compound represented by the formula



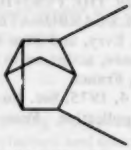
wherein is selected from the group consisting of



where R_1 and R_2 are the same R_1 and R_2 may be H, an alkyl group of 1 to 5 carbons, phenyl, Br or Cl and and where R_1 and R_2 are different, R_1 is H and and R_2 may be any of the group consisting of an alkyl group of 1 to 5 carbons, phenyl, Br and Cl



where R_3 is H or CH_3 and



4,013,704

2,5-DIISOPROPYLTEREPHTHALONITRILE

Elmore Louis Martin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 241,850, April 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 153,428, June 15, 1971, abandoned. This application May 2, 1975, Ser. No. 573,991

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C07C *121/58*

U.S. Cl. 260—465 H **1 Claim**

1. 2,5-Diisopropylterephthalonitrile.

4,013,705

AMMOXIDATION PROCESS FOR MAKING DICYANONAPHTHALENE

Ronald D. Bushick, Glen Mills, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Filed Mar. 9, 1976, Ser. No. 665,342

Int. Cl.² C07C *120/14, 121/62*

U.S. Cl. 260—465 C **12 Claims**

1. An ammoxidation process for preparing 2,6-dicyanonaphthalene from 2,6-dimethylnaphthalene which comprises reacting said dimethylnaphthalene and ammonia at a temperature of from about 375° to about 550° C. in the presence of added oxygen, the molar ratio of ammonia to dimethylnaphthalene being from at least about 10:1 to about 30:1 and the catalyst for said reaction comprising at least about 0.5 to 20% by weight of an alkali metal vanadium bronze supported on α-alumina and promoted with an iron compound in an amount from about 0.5 mole percent to about 25 mole percent of the catalyst expressed as oxides.

4,013,706

DERIVATIVES OF SUBSTITUTED UREA, ACYL UREAS, AND SULPHONYL UREAS, AND A PROCESS FOR PRODUCING THE SAME

Jesus Anatol, Paris, and Jean Berecoechea, Reims, both of France, assignors to Sucreries du Soissonnais et Compagnie Sucriere, Paris, France

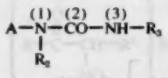
Filed Nov. 13, 1974, Ser. No. 523,550

Claims priority, application France, Nov. 14, 1973, 73.40527; Oct. 25, 1974, 74.35907

Int. Cl.² C07C *125/06*

U.S. Cl. 260—471 C **5 Claims**

1. A process for producing compounds of the general formula:



in which A is hydrogen or a monovalent group $R_1 - X$ (in which X is —CO or $—SO_2$, and R_1 is alkyl, cycloalkyl, aralkyl, alkoxy, aryl, aryloxy, or etheroxy), R_2 is hydrogen, alkyl, cyclo-alkyl, aralkyl, or aryl, and R_3 is hydrogen or an alkyl radical derived from a secondary or tertiary alcohol, with the restriction that, when R_2 is hydrogen, R_3 is alkyl and that when R_3 is hydrogen, R_2 is alkyl, cycloalkyl, aralkyl, or aryl, said process comprising

reacting a cyanamide of the formula:

(in which A and R_2 have the meanings given above), with a compound adapted to readily form a carbo cation (R_3^+) selected from the group consisting of tertiary alcohols, secondary alcohols and unsaturated compounds, in the presence of a catalyst of sulfuric acid or a Lewis acid.

4,013,707

SUBSTITUTED PHENYL ESTERS OF PGA₁

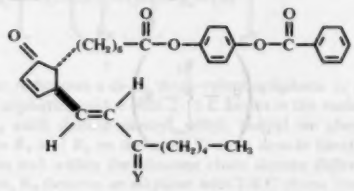
Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 431,600, Jan. 8, 1974, Pat. No. 3,952,048. This application Apr. 21, 1976, Ser. No. 679,428

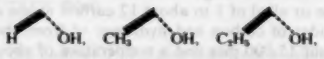
Int. Cl.² C07C *177/00*

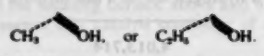
U.S. Cl. 260—471 R **8 Claims**

1. An optically active compound of the formula:

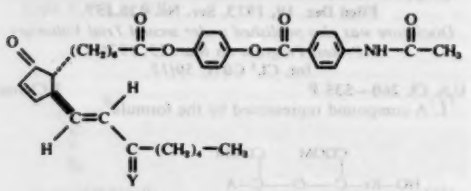


or a racemic compound of that formula and the mirror image thereof, wherein Y is

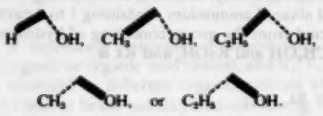




5. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein Y is



4,013,708

ARYLCHALCOGENO-SUBSTITUTED ALIPHATIC ACIDS AND ESTERS

Georges Haas, Oberwil; Pier Giorgio Ferrini, Binningen, and Alberto Rossi, Oberwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

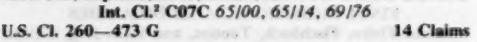
Filed Sept. 11, 1974, Ser. No. 505,111

Claims priority, application Switzerland, Sept. 18, 1973, 13387/73; Sept. 18, 1973, 13389/73

Int. Cl.² C07C *65/00*, *65/14*, *69/76*

U.S. Cl. 260—473 G 14 Claims

1. A compound of the general formula I



(I),

wherein R_1 denotescycloalkyl or 1-cycloalkenyl with 5 to 8 ring members, Ph denotes o- m- or p-phenylene, unsubstituted or monosubstituted by lower alkyl, lower alkoxy or halogen, X denotes the oxy or thio group, R_2 denotes hydrogen or alkyl with 1 to 4 C atoms, R_4 is hydrogen or, if R_1 is 1-cycloalkenyl, it is also alkyl with 1 to 4 C atoms, R_3 denotes carboxyl or carboxyl esterified by a lower alkanol, cycloalkanol or phenylalkanol, and CR_2R_4-alk denotes alkylene with 4 to 11 C atoms, straight or branched in the α-position to the group X, which separates the groups [R_1-Ph-X-CR_2R_4] X and R_3 by 4 to 11 carbon atoms, or a therapeutically acceptable salt thereof.

4,013,709

PRODUCTION OF ω-FORMYL CARBOXYLIC ACID ESTERS

Helmut Waldmann, Leverkusen; Wulf Schwerdtel, Leverkusen-Steinbuechel, and Wolfgang Swodenk, Odenthal-Gloebusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

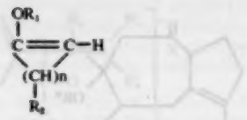
Division of Ser. No. 410,074, Oct. 26, 1973. This application Jan. 23, 1976, Ser. No. 651,989

Claims priority, application Germany, Oct. 27, 1972, 2252780

Int. Cl.² C07C *67/00*

U.S. Cl. 260—483 9 Claims

1. A process for the production of an ω-formyl carboxylic acid ester, comprising reacting hydrogen peroxide with an enol ether of a cyclic ketone of the formula



wherein

R_1 is alkyl of 1 to 3 carbon atoms, or alkyl of 1 to 3 carbon atoms substituted by fluorine, chlorine, alkoxy of 1 to 3 carbon atoms, cyano or phenyl,

n is an integer of about 3 to 10, and

R_2 each independently is hydrogen, fluorine, chlorine, cyano, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 6 carbon atoms, alkyl of 1 to 6 carbon atoms substituted by fluorine, chlorine, cyano or alkoxy of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms substituted by fluorine, chlorine, cyano, alkoxy of 1 to 4 carbon atoms or alkyl of 1 to 6 carbon atoms,

in the presence of a catalyst consisting essentially of a carboxylate, carbonyl, nitrosocarbonyl, acetonate or acetylacetonate of a metal of the Fifth or Sixth Secondary Group of the Periodic Table at a temperature of −80° to +30° C.

4,013,710

LIQUID VINYLIDENE-TERMINATED POLYMERS

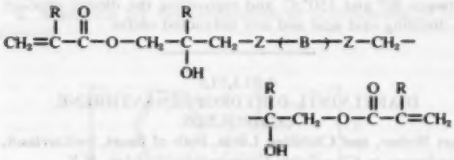
Douglas E. Skillicorn, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 292,926, Sept. 28, 1972, Pat. No. 3,910,992. This application June 11, 1975, Ser. No. 585,962

Int. Cl.² C07C *69/54*, *69/66*

U.S. Cl. 260—484 A 5 Claims

1. A liquid vinylidene-terminated polymer having a molecular weight of from about 1000 to about 20,000 of the structure



wherein B is a polymeric backbone of carbon-carbon linkages derived from polymerized units of dienes containing 4 to about 8 carbon atoms interpolymerized with vinyl nitriles; Z is selected from the group consisting of —O—, —S—, —NH—,

and —O—CH_2—CH_2—; and R is hydrogen or an alkyl radical containing 1 to 4 carbon atoms.

4,013,711

AZULENE COMPOUNDS

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

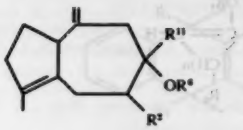
Division of Ser. No. 363,207, May 23, 1973, Pat. No. 3,935,253. This application Nov. 3, 1975, Ser. No. 628,304

Claims priority, application Switzerland, June 5, 1972, 8265/72

Int. Cl.² C07C *69/02*, *69/06*, *69/14*, *69/78*

U.S. Cl. 260—488 B 6 Claims

1. A compouond of the formula



wherein R^2 represents hydrogen or lower alkyl,

R^4 represents the acyl residue of a member selected from the group consisting of formic acid, acetic acid, propionic acid butyric acid and benzoic acid and R^{11} represents hydrogen or lower alkyl.

4,013,712

PROCESS FOR MAKING ALKANE-1,2-DIOL DIESTERS

Dukie Ragoonanan, and Brian W. Harris, both of Trinidad, Trinidad And Tobago, assignors to Texaco Trinidad, Inc., Trinidad, Trinidad And Tobago

Filed Mar. 6, 1975, Ser. No. 555,917

Int. Cl.² C07C *67/04*

U.S. Cl. 260—497 R **6 Claims**

1. A liquid phase process for producing alkane-1,2-diol diesters in the absence of metal catalyst from an alkene of the formula:

$$RCH=CH_2$$

wherein R is an alkyl group having from 5 to 20 carbon atoms, comprising pre-aerating said alkene with an oxygen containing gas to form the corresponding peroxide; determining the maximum peroxide content of said alkene during aeration; terminating said aeration when said content has decreased from 20 to 40 percent from its maximum, decomposing said peroxide with a mono-carboxylic acid having from 1 to 6 carbon atoms; heating the resulting decomposition mixture to between 80° and 150° C. and recovering the diester product by distilling said acid and any unreacted olefin.

4,013,713

DIARYLVINYL-DIHYDROPHENANTHRENE COMPOUNDS

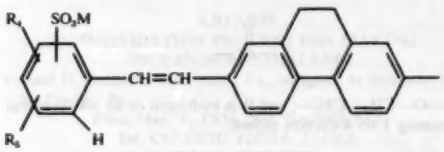
Kurt Weber, and Christian Lüthi, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

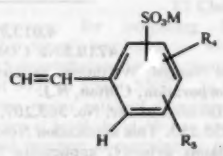
Continuation of Ser. No. 316,804, Dec. 20, 1972, abandoned. This application Sept. 15, 1975, Ser. No. 613,697

Int. Cl.² C07C *143/24*

U.S. Cl. 260—505 R **5 Claims**

1. Styryl compounds corresponding to the formula





wherein R_4 denotes hydrogen, an alkyl group of 1 to 4 carbon atoms, an alkoxy group of 1 to 4 carbon atoms, or halogen, R_5 denotes hydrogen, an alkyl group with 1 to 4 carbon atoms, an alkoxy group with 1 to 4 carbon atoms, halogen, or SO_3M and M represents a hydrogen ion or a salt-forming cation.

4,013,714

SUBSTITUTED BIS-(DICARBOXYMETHYL)-ETHERS

Kent P. Lannert, Freeburg, Ill., assignor to Monsanto Company, St. Louis, Mo.

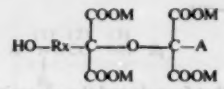
Filed Dec. 19, 1973, Ser. No. 426,157

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07C *59/12*

U.S. Cl. 260—535 P **3 Claims**

1. A compound represented by the formula



wherein M is selected from the group consisting of alkali metal, ammonium, alkyl ammonium containing 1 to 4 carbon atoms and alkanol ammonium containing 1 to 4 carbon atoms; A is selected from the group consisting of hydrogen, methyl, ethyl, $—CH_2OH$ and RxOH; and Rx is

Rz being selected from the group consisting of hydrogen, alkyl, alkoxy alkyl, and —COOM, the total number of carbon atoms in Rx being from 2 to 22.

4,013,715

PROCESS FOR THE MANUFACTURE OF 2-HALO-ETHANE-PHOSPHONIC ACID DIHALIDES AND VINYL-PHOSPHONIC ACID DIHALIDES

Manfred Finke, Fischbach, Taunus, and Hans-Jerg Kleiner, Bad Soden, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

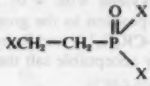
Filed Nov. 18, 1974, Ser. No. 524,812

Claims priority, application Germany, Nov. 19, 1973, 2357676

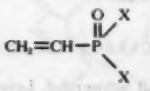
Int. Cl.² C07F *9/38*

U.S. Cl. 260—543 P **24 Claims**

1. A process for the manufacture of halo-ethane-phosphonic acid dihalides and vinyl-phosphonic acid dihalides of the formulae I and II

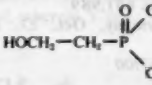


(I)



(II)

in which X represents halogen, which comprises reacting hydroxy-ethane-phosphonic acid of the formula



(III)

a salt or an ester thereof with an acid halide of the formula

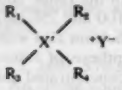
$(CO)_nX_2$ (IV)

in which X has the meaning defined above and *n* stands for 1 or 2, in the presence of a catalyst consisting of a compound that:

contains at least one nitrogen or phosphorous atom which is bound by three or four valences to carbon, two valences possibly forming a double bond and further has the formula V, VI, or VII:

(V),

$R_1-CH=X'-R_2$ (VI),


(VII),

in which X′ represents a nitrogen or phosphorous atom, Y is an inorganic or organic acid radical, and R_1, R_2, R_3, and R_4 are identical or different organic radicals which are straight chain or branched alkyl radicals having from 1 to 20 carbon atoms, alkenyl radicals having from 2 to 20 carbon atoms, cycloalkyl radicals having from 4 to 8 carbon atoms, or phenyl or benzyl groups or acyl groups having from 1 to 4 carbon atoms, all radicals R_1 to R_4 possibly being substituted by halogen, or alkoxy having from 1 to 4 carbon atoms, or a dialkyl-amino group the alkyl groups of which have from 1 to 4 carbon atoms, two of the radicals R_1 to R_4 may form a ring, and the catalyst has a molecular weight of up to 500; or

contains a nitrogen or phosphorus atom bound by three valences to carbon and has the formula VIII:

(VIII)

in which Z represents oxygen or, if X′ is phosphorus, Z also represents sulfur, two halogen atoms, or the group NR_5 in which R_5 has the same meaning as R_1 or represents hydrogen, and 2 or 3 of the radicals R_1 to R_3 may form a cycle, optionally including for example oxygen, sulfur, or nitrogen as a hetero-atom.

4,013,716

PREPARATION OF N-ARYL-IMIDOCARBONYL UREAS

Jean Abblard, St. Didier au Mont d'Or, and Pierre Poignant, Nyons, both of France, assignors to PEPRO, Societe pour le Developement et la Vente de Specialities Chimiques, Lyon, France

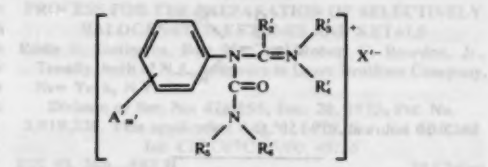
Filed Mar. 25, 1974, Ser. No. 454,303

Claims priority, application France, Mar. 27, 1973, 73.11843

Int. Cl.² C07C 127/19; A01N 9/20

U.S. Cl. 260—553 A **4 Claims**

1. A process for the preparation of a compound of the formula



wherein

A′ is H, halogen, C_1–C_4 alkyl, trifluoromethyl, methoxy or ethoxy;

m′ is an integer of 1 to 3;

R_2′ is H or methyl;

R_3′ is a C_1–C_4 alkyl;

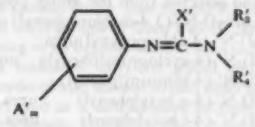
R_4′ is a C_1–C_4 alkyl;

R_5′ is a C_1–C_4 alkyl;

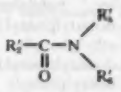
R_6′ is a C_1–C_4 alkyl; and

X′ is halide

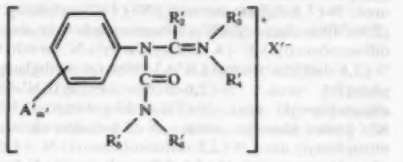
comprising reacting a formamidine of the formula



with an amide of the formula



4. A process for the preparation of a compound of the formula



wherein

A′ is H, halogen, C_1–C_4 alkyl, trifluoromethyl, methoxy or ethoxy;

m′ is an integer of 1 to 3;

R_2′ is H or methyl;

R_3′ is a C_1–C_4 alkyl;

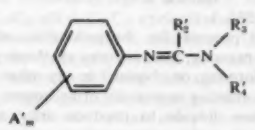
R_4′ is a C_1–C_4 alkyl;

R_5′ is a C_1–C_4 alkyl;

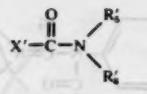
R_6′ is a C_1–C_4 alkyl; and

X′ is halide

comprising reacting a formamidine of the formula



with a compound of the formula



for 5–30 hours at 50°–150° C.

4,013,717

BENZOYL PHENYL UREA DERIVATIVES HAVING INSECTICIDAL ACTIVITIES

Kobus Wellinga, and Rudolf Mulder, both of Weesp, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 354,393, April 25, 1973, Pat. No. 3,933,908, which is a division of Ser. No. 143,668, May 14, 1971, Pat. No. 3,748,356. This application Oct. 23, 1975, Ser. No. 625,126

Claims priority, application Netherlands, May 15, 1970, 7007040

Int. Cl.² C07C *127/22*; A01N *9/20*

U.S. Cl. 260—553 E 29 Claims

1. A compound selected from the group consisting of N-(2,6-dimethylbenzoyl)-N′-(3,4-dichlorophenyl) urea, N-(2,6-dimethylbenzoyl)-N′-(4-chlorophenyl)urea, N-(2,6-dichlorobenzoyl)-N′-(4-cyclopropylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-isopropylphenyl) urea,N-(2,6-dichlorobenzoyl)-N′-(4-n.butylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-t.butylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-phenylphenyl)urea,N-(2,6-dichlorobenzoyl)-N′-(4-n.propylphenyl) urea, N-(2,6dichlorobenzoyl)-N′-(3-cyclopropylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-sec. butylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-isobutylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-ethylphenyl) urea, N-(2,6dichlorobenzoyl)-N′-(4-n.dodecylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-benzylphenyl) urea, N-(2,6dichlorobenzoyl)-N′-(methyl)-N′-(4-t.butylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(ethyl)-N′-(4-isopropylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(ethyl)-N′-(4-n.butylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(ethyl)-N′-(4-t.butylphenyl) urea, N-(2,6-difluorobenzoyl)-N′-(4-n.butylphenyl) urea, N-(2,6-difluorobenzoyl)-N′-(4-t-butylphenyl) urea, N-(2,6-difluorobenzoyl)-N′-(4-isopropylphenyl) urea, N-(2,6-difluorobenzoyl)-N′-(4-isobutylphenyl)-N′-(methyl) urea, N-(2,6-dichlorobenzoyl)-N′-(3-chloro-4-methylsulphonylphenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(2-methyl-4-chloro-phenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(methyl)-N′-(4-nitro-phenyl) urea, N-(2,6-dichlorobenzoyl)-N′-(4-nitrophenyl) urea, N-(2,6-difluorobenzoyl)-N′-(4-thiomethylphenyl) urea, and N-(2,6-difluorobenzoyl)-N-(methoxymethyl)-N′-(3,4-dichlorophenyl) urea.

4,013,718

INTEGRATED PROCESS FOR THE PRODUCTION OF UREA

Mario Guadalupi; Giorgia Pagani, both of Milan; Umberto Zardi, San Donato Milanese, and Ivo Paris, Melegnano, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Continuation of Ser. No. 177,629, Sept. 3, 1971, abandoned. This application Mar. 20, 1974, Ser. No. 453,028

Claims priority, application Italy, Sept. 3, 1970, 29295/70

Int. Cl.² C07C *126/00*

U.S. Cl. 260—555 A 4 Claims

1. Integrated process, for the production of urea which comprises compressing, the raw urea synthesis gases coming from steam reforming, or obtained in any other conventional manner, and consisting essentially of hydrogen, nitrogen and sufficient carbon dioxide to produce urea, to a pressure slightly higher than the urea synthesis pressure and, after compression, passing said raw urea synthesis gases still containing the carbon dioxide necessary for the production of urea to the bottom of a jacketted vertical film heat exchanger wherein it is counter-currently contacted with a film of ammonia solution to produce carbamate; removing reaction heat by causing a cooling fluid film to flow through said jacket; withdrawing the obtained carbamate from the bottom of said vertical film heat exchanger wherein the temperature rages between 100° and 250° C, as a very concentrated solution; withdrawing raw synthesis gases containing ammonia and free of carbon dioxide from the top of said vertical film heat exchanger and passing them into a cooler where a portion of the ammonia condenses, feeding said condensed ammonia to said vertical film heat exchanger, the cooled gas being methanated and after cooling the methanated gases are passed to a jacketted film absorber with vertical tubes wherein they meet in countercurrent flow a film of water or a very diluted aqueous solution of ammonia, which absorbs the ammonia contained in said methanated gases; cooling said film absorber by a cooling fluid which flows along the jacket side so as to maintain in said film absorber a temperature in the range 10°–60° C, its pressure being comprised between 100 and 250 kg/cm², said film absorber being provided at the bottom also with the gas coming from an apparatus for the synthesis of ammonia, from the bottom of said film absorber a concentrated ammonia solution is withdrawn and sent to said vertical film heat exchanger where it absorbs the CO_2, forming carbamate; from the top of the said film absorber venting part of the gaseous stream coming from the synthesis of the ammonia to avoid the accumulation of inerts, thereafter mixing said gaseous stream from the synthesis of ammonia and the methanated gases after having gone through said film absorber; the gaseous mixture so obtained, saturated with water being subsequently dehydrated by contact with liquid ammonia which is mixed thoroughly with said gaseous mixture in an apparatus that forms a large exchange surface between said gaseous mixture gas and ammonia, immediately downstream of such contact between ammonia and said gaseous mixture separating said gaseous mixture and said liquid ammonia; forwarding the separated gaseous mixture to said apparatus for the synthesis of ammonia after said gaseous mixture is compressed up to the synthesis pressure of ammonia, namely 100–250 kg/cm² and passing a solution of ammonia, to the urea solution coming from a carbamate decomposer combining the solution of the carbamate with ammonia which is forwarded to the bottom of a urea reactor in the same zone wherein are introduced the vapors coming from a carbamate decomposer, the temperature being regulated by the amount of the vapors introduced into the exchanger from said carbamate decomposer and ranges between 150° and 250° C., while the pressure ranges between 100 and 250 kg/cm²; withdrawing solution of urea, carbamate, ammonia and water from the top of the reactor which is sent to said carbamate decomposer where it is heated and stripped by means of NH_3 which flows countercurrently and acts as a stripping agent; the urea from the solution so obtained being thereafter separated.

4,013,719

ADAMANTYL PHENOXY ALKYLAMIDES

Georges Haas, Oberwil; Roland Jaques, Allschwil; Alberto Rossi, Oberwil, and Martin Rüegg, Fullinsdorf, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 409,192, Oct. 24, 1973, Pat. No. 3,933,835. This application Aug. 18, 1975, Ser. No. 605,574

Claims priority, application Switzerland, Nov. 1, 1972, 15923/72; Sept. 18, 1973, 13386/73

Int. Cl.² C07C *103/26*, *83/10*; A61K *31/165*

U.S. Cl. 260—559 B 3 Claims

1. A compound of the formula

$$R_1 - Ph - X - alk - R_2$$

wherein R_1 is adamantyl, Ph is phenylene or phenylene substituted by nitro, lower alkyl, lower alkoxy, halogen or trifluoromethyl, X is oxy, alk is unbranched alkylene with 1 to 10

carbon atoms, unbranched alkylene with 1 to 10 carbon atoms which carries an unbranched alkyl radical with 1 to 8 carbon atoms in the α-position with respect to R_2, or alkenylene with 2 to 7 carbon atoms which is unbranched or branched with an unbranched alkyl radical of 1 to 3 carbon atoms in α- or β-position with respect to R_2, and R_3 is carbamoyl N-mono- or N,N-di-lower alkylcarbamoyl or N-hydroxycarbamoyl, or a therapeutically acceptable salt thereof.

4,013,720

AMINE CONDENSATE

Eric Samuel Nicholson, and Brian Thomas Ashworth, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

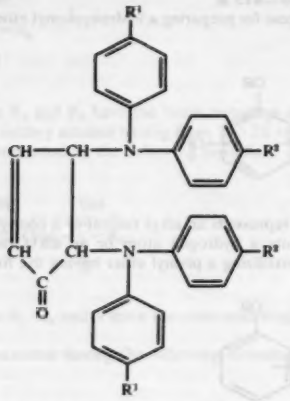
Filed Jan. 20, 1976, Ser. No. 650,756

Claims priority, application United Kingdom, Feb. 10, 1975, 5564/75

Int. Cl.² C07C *87/54*

U.S. Cl. 260—570.5 CA **3 Claims**

1. An amine condensate of the formula:



where R^1 and R^2 are the same or different and are hydrogen, alkyl, alkoxy or dialkylamino.

4,013,721

PROCESS OF CATALYTIC OXIDATION OF LUPULONES TO HULUPONES

Wolfgang Reininger, Munich, and Alfons Hartl, Germering, both of Germany, assignors to Atlantic Research Institute Limited, Nassau, Bahamas

Filed Sept. 13, 1973, Ser. No. 397,106

Claims priority, application Germany, Sept. 13, 1972, 2244895

Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 D **13 Claims**

1. A process of catalytic oxidation wherein lupulone or lupulone-bearing material is mixed into a polar alkaline medium in which lupulates are soluble and reacted with oxygen-containing gas in contact with a catalyst selected from the group consisting of noble metals, transition metals, and bismuth oxide applied to a carrier selected from the group consisting of kieselguhr, activated carbon, calcium phosphate, magnesium oxide, dolomite, fired clay and strongly acid cation exchangers.

4,013,722

PROCESS FOR THE PREPARATION OF SELECTIVELY HALOGENATED KETONES AND KETALS

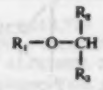
Eddie N. Gutierrez, Fort Lee, and Robert C. Reardon, Jr., Tenafly, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 426,855, Dec. 20, 1973, Pat. No. 3,919,328. This application Aug. 1, 1975, Ser. No. 601,242

Int. Cl.² C07C *45/00, 49/16*

U.S. Cl. 260—593 H **10 Claims**

1. A method for preparing selectively halogenated ketones which comprises preparing a mixture of symmetrically and unsymmetrically halogenated ketals by treating with a halogen selected from the group consisting of chlorine and bromine ether compounds of the formula:



wherein R_1 is a straight chain unsubstituted alkyl group of from 1 to 20 carbon atoms, and R_2 and R_3 are straight chain unsubstituted alkyl groups of from 1 to 10 carbon atoms; said treatment being in an organic solvent selected from the group consisting of methanol, ethylene glycol and 2,3-butanediol wherein the ratio of said solvent to said ether is from about 5:1 to about 20:1 and at a temperature of from about 0° C to about 80° C whereby symmetrically halogenated ketals and unsymmetrically halogenated ketals are formed; separating said symmetrically halogenated ketals from said mixture subsequently and separately hydrolyzing both said unsymmetrically and symmetrically halogenated ketals under acid conditions.

4,013,723

PROCESS FOR PREPARING ALDEHYDES

Helmut Waldmann; Wulf Schwerdtel, both of Leverkusen, and Wolfgang Swodenk, Odenthal-Globusch, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

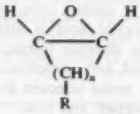
Filed Dec. 27, 1972, Ser. No. 318,965

Claims priority, application Germany, Jan. 13, 1972, 2201455

Int. Cl.² C07C *45/22, 47/12, 47/14, 47/28*

U.S. Cl. 260—601 R **5 Claims**

1. Process for splitting oxirane compounds into aldehydes which comprises reacting an oxirane compound having the formula



wherein

n is an integer of from 3 to 10 and each of the carbon atoms determined by *n* are substituted by R independently of each other, and

R is selected from the group of hydrogen, fluorine, C_1-C_6-alkoxy, C_1-C_6- alkyl, C_5-C_7- cycloalkyl and phenyl optionally substituted by fluorine, chlorine, or C_1-C_6 alkoxy,

with non-aqueous hydrogen peroxide in a solvent that does not react with said oxirane compound nor cause decomposition of said hydrogen peroxide, in the presence of at least one vanadium or molybdenum acetate acetyl acetonate, benzoate or naphthenate in an amount of 0.01 to 10 moles-% based on the amount of hydrogen peroxide, and at a temperature in the range of from −80° to +100° C.

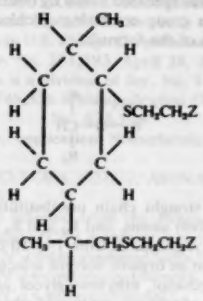
4,013,724

SYNTHESIS OF A DITHIOL FROM 1-METHYL-2-(2-HYDROXYETHYLTHIO)-4-[1-METHYL-2-(2-HYDROXYETHYLTHIO)ETHYL]CYCLOHEXANE

Paul F. Warner, Phillips, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 24, 1975, Ser. No. 598,964
Int. Cl.² C07C 149/26
U.S. Cl. 260—609 D 3 Claims

1. A group of compounds having a structural formula of



where the Z group is one of OH and SH but not both in the same compound.

4,013,725

PROCESS FOR PREPARING HYDROPEROXIDE

Eiichi Yonemitsu, Kashiwa; Takeo Igarashi, Nagareyama; Naoto Osaki; Tetsuo Aoyama, both of Tokyo, and Yukiya Nakazato, Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed May 6, 1975, Ser. No. 574,898
Claims priority, application Japan, May 14, 1974, 49-53570; May 14, 1974, 49-53571
Int. Cl.² C07C 179/02, 179/04
U.S. Cl. 260—610 B 14 Claims

1. A process for preparing hydroperoxide by autoxidizing secondary alkyl group-substituted methylbenzenes, wherein the secondary alkyl group is isopropyl or isobutyl, with oxygen-containing gas in the presence of water at a pressure of about atmospheric up to about 50 kg/cm² gauge and at a temperature of from 50° to 130° C which comprises using as a catalyst a water-soluble chelate compound in which nitrogen-containing polycarboxylic acid is selected from the group consisting of ethylene diamine tetraacetic acid, cyclohexane diamine tetraacetic acid, and nitrilotriacetic acid, and is coordinated to at least one metal selected from the class of cobalt, nickel, manganese, copper, and iron.

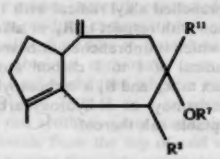
4,013,726

AZULENE COMPOUNDS

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 363,207, May 23, 1973, Pat. No. 3,935,253. This application Nov. 3, 1975, Ser. No. 628,303
Claims priority, application Switzerland, June 5, 1972, 8265/72
Int. Cl.² C07C 43/18
U.S. Cl. 260—611 F 6 Claims

1. A compound of the formula



VI

wherein R^2 represents hydrogen or lower alkyl, R^7 represents lower alkyl, or lower alkoxy lower alkyl, "lower" referring to groups having 1 to 6 carbon atoms, and R^{11} represents hydrogen or lower alkyl.

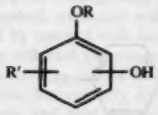
4,013,727

PROCESS FOR PREPARING HYDROXYPHENYL ETHERS

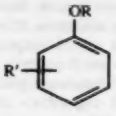
Sumio Umemura; Nagaaki Takamitsu; Toshikazu Hamamoto, and Nobuyuki Kuroda, all of Ube, Japan, assignors to UBE Industries, Ltd., Ube, Japan

Filed Oct. 20, 1975, Ser. No. 623,937
Claims priority, application Japan, Nov. 7, 1974, 49-127515; Nov. 7, 1974, 49-127516
Int. Cl.² C07C 37/00
U.S. Cl. 260—613 R 16 Claims

1. A process for preparing a hydroxyphenyl ether having the formula:



wherein R represents an alkyl radical or a phenyl radical and R′ represents a hydrogen atom or an alkyl radical, which comprises oxidizing a phenyl ether having the formula:



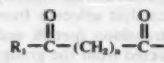
wherein R and R′ have the same meanings as above, with hydrogen peroxide in the presence of a ketone, or with a ketone peroxide, at a temperature of 20° to 250° C. in the presence of a catalyst selected from the group consisting of an activated clay, a boric acid or a boric acid derivative, the amount of catalyst being more than 0.001 weight percent of said phenyl ether, said ketone being selected from the group consisting of (i) through (iii) following:

i. a ketone having from 3 to 20 carbon atoms and represented by the following formula:

$$R_1 - CO - R_2$$

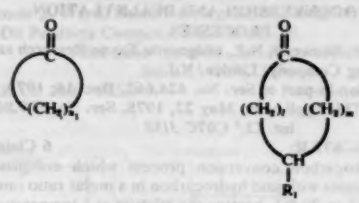
wherein R_1 and R_2 may be the same or different and each represents a straight or branched alkyl group of 1 – 18 carbon atoms or phenyl group, and either R_1 or R_2 may be an aliphatic group having an unsaturated bond;

ii. a diketone having from 3 to 20 carbon atoms and represented by the following formula:



wherein n is an integer of from 0 to 16, inclusive, and R_1 and R_2 have the same meanings as above;

iii. a cycloketone having the following formula:

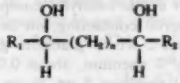


wherein n_1 represents an integer of from 4 to 11, inclusive, $l+m$ represents an integer of from 3 to 10, inclusive, and R_1 has the same meaning as above; and said ketone peroxide being obtained by reaction of hydrogen peroxide and a ketone selected from the group of said (i) to (iii) or derived from a secondary alcohol selected from the group consisting of a secondary alcohol having the following formula:

iv. a secondary alcohol having from 3 to 20 carbon atoms and represented by the following formula:

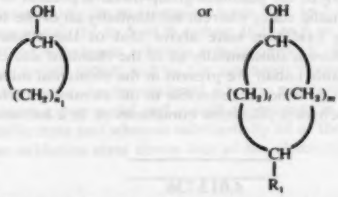
wherein R_1 and R_2 have the same meanings as above;

v. a di-secondary alcohol having from 3 to 20 carbon atoms and represented by the following formula:



wherein R_1, R_2 and n have the same meanings as above; and

vi. a cycloalcohol having the following formula:



wherein R_1, n_1, l and m have the same meanings as above.

4,013,728

PROCESS FOR HALOGENATING A BISPHENOL

David R. Brackenridge, Royal Oak, Mich., assignor to Ethyl Corporation, Richmond, Va.

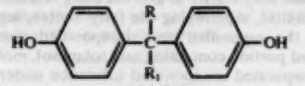
Continuation-in-part of Ser. No. 281,851, Aug. 18, 1972, abandoned. This application Apr. 5, 1976, Ser. No. 673,387

Int. Cl.² C07C *37/00*

U.S. Cl. 260—619 A **11 Claims**

1. Process for producing an alkylidene bis(dibromophenol), said process comprising a bromination step and a post-heating step;

said bromination step comprising reacting bromine and an alkylidene bisphenol having the formula



wherein R and R_1 are independently selected from the class consisting of hydrogen and alkyl groups of from 1 to about 3 carbons, in a water-acetic acid mixture, the concentration of acetic acid being from about 75 to about 95 weight percent; and said post-heating step comprising subsequently heating the thereby-produced reaction mixture at a temperature of from about 80° to about 120° C. for a period of from about 5 to about 60 minutes.

4,013,729

HYDROCARBON UPGRADING PROCESS IN SECONDARY ALCOHOL PRODUCTION

Robert M. Suggitt, Wappingers Falls, and Walter C. Gates, Jr., Newburg, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 428,638, Dec. 26, 1973. This application Jan. 26, 1976, Ser. No. 652,584

Int. Cl.² C07C *29/12*

U.S. Cl. 260—632 C **11 Claims**

1. In a process for producing secondary alcohols from n-paraffins wherein a portion of said n-paraffin is converted to a borate ester along with oxygenated by-products, wherein said borate ester is separated from a mixture of unreacted paraffin, olefin and oxygenated by-products and where said borate ester is hydrolyzed to said secondary alcohol, the improvement which comprises:

a. catalytically hydrogenating said mixture at a temperature of from about 600° to 750° F. in the presence of a catalyst composed of alumina, a Group VIII metal and from about 0.05 to 2.0 weight percent of an alkali metal oxide, alkaline earth metal oxide or thallous oxide; and

b. recycling said hydrogenated product of (a) for conversion with said n-paraffin to said borate ester.

4,013,730

PROCESS FOR THE PREPARATION OF MONOCHLOROTOLUENE

John C. Graham, Warren, Mich., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,691

Int. Cl.² C07C *25/04*

U.S. Cl. 260—650 R **14 Claims**

1. A process for the preparation of parachlorotoluene which comprises reacting toluene with chlorine in the presence of about 0.01 to about 10.0 percent by weight of a catalyst system comprising a Lewis acid catalyst and a co-catalyst selected from the group consisting of diphenyl selenide and aluminum selenide.

4,013,731

PROCESS FOR THE MANUFACTURE OF SOLANESOL

Masako Asahina, Tokyo; Hideki Kato, Kawagoe, and Hideaki Fukawa, Fukuoka, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 352,322, April 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 29,702, July 21, 1972, abandoned. This application July 28, 1975, Ser. No. 599,780

Claims priority, application Japan, Apr. 24, 1969, 44-31303

Int. Cl.² C07C *29/00*, *29/24*

U.S. Cl. 260—643 A **11 Claims**

1. A process for producing solanesol from potato leaves comprising: extracting potato leave with an organic solvent in which the fatty matter of potato leaves is soluble, evaporating

off said organic solvent from the resulting organic solvent extract of said fatty matter to give the pasty residue containing said fatty matter, saponifying the fatty matter, separating by extraction the saponified and unsaponified portions, said unsaponified portion containing said solanesol, molecular-distilling the separated unsaponified substance under a vacuum higher than 1×10^{-2} mmHg, collecting the solanesol fraction at 180° to 240° C. and further refining said solanesol fraction by fractionally crystallizing from an organic solvent.

4,013,732

CONVERSION OF METHANOL TO GASOLINE WITH MINIMUM DURENE PRODUCTION

Clarence D. Chang, Princeton, and William H. Lang, Pennington, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 17, 1975, Ser. No. 623,239
Int. Cl.² C07C *1/20*
U.S. Cl. 260—668 R **6 Claims**

1. A method for converting a feed material selected from the group comprising methanol, dimethylether, and mixtures thereof to aliphatic and aromatic gasoline boiling components which comprises, passing the feed material at a temperature selected from within the range of 500° F to 1000° F and a pressure below 750 psig in contact with a special class of crystalline zeolite conversion catalysts represented by ZSM5 wherein the crystalline zeolite is used with a binder support material substantially free of aluminum oxide and, recovering an aromatic gasoline product of desired low durene concentration further controlled by using a low operating pressure.

4,013,733

DEHYDROGENATION METHOD

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 434,476, Jan. 18, 1974, Pat. No. 3,939,220, which is a continuation-in-part of Ser. No. 304,177, Nov. 6, 1972, Pat. No. 3,790,473, which is a continuation-in-part of Ser. No. 142,079, May 10, 1971, Pat. No. 3,702,294, which is a continuation-in-part of Ser. Nos. 819,114, April 24, 1969, abandoned, and Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application Oct. 6, 1975, Ser. No. 620,078
The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.
Int. Cl.² C10G *35/06*; C07C *3/28*, *5/32*
U.S. Cl. 260—668 D **12 Claims**

1. A method for dehydrogenating a dehydrogenatable hydrocarbon comprising contacting said hydrocarbon, at dehydrogenation conditions, with a catalytic composite comprising a combination of a platinum or palladium component, an iridium component, a rhenium component and a tin component with a porous carrier material in amounts sufficient to result in a composite containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % iridium, about 0.01 to about 2 wt. % rhenium, and about 0.01 to about 5 wt. % tin, wherein substantially all of the platinum or palladium component, the iridium component and the rhenium component are present in the corresponding elemental metallic state and wherein substantially all of the tin component is present in an oxidation state above that of the elemental metal.

4,013,734

NOVEL CATALYST AND ITS USE FOR STEAM HYDROCONVERSION AND DEALKYLATION PROCESSES

Chang J. Kim, Somerset, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 424,662, Dec. 14, 1973, abandoned. This application May 22, 1975, Ser. No. 579,867
Int. Cl.² C07C *3/58*
U.S. Cl. 260—672 R **6 Claims**

1. A hydrocarbon conversion process which comprises comingling water with said hydrocarbon in a molar ratio ranging from 1.0:1 to 20.0:1, heating the mixture at a temperature of from 300° to 600° C., at a pressure of from 0–1500 psig, in contact with a catalyst composition consisting of a Group VIII metal selected from the group consisting of rhodium, palladium, ruthenium, iridium and platinum in combination with a Group VB element, said Group VB element and metal being deposited on an alumina support.

5. A process according to claim 1 wherein said hydrocarbon conversion process is a dealkylation process.

4,013,735

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights; John C. Hayes, Palatine, and Ernest L. Pollitzer, Skokie, all of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 564,386, April 2, 1975, Pat. No. 3,960,711. This application May 18, 1976, Ser. No. 681,007
Int. Cl.² C07C *3/04*; C10G *27/08*; B01J *23/63*
U.S. Cl. 260—673.5 **28 Claims**

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 2 wt. % rhenium, about 0.05 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % tin, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, rhenium, catalytically available cobalt and tin are uniformly dispersed throughout the porous carrier material; wherein the average crystallite size of the cobalt and tin is less than 100 Angstroms in maximum dimension; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the tin is present in an oxidation state above that of the elemental metal; and wherein substantially all of the rhenium and catalytically available cobalt are present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrocyclization conditions or in a mixture of these states.

4,013,736

SYNTHESIS OF LOW VISCOSITY LOW POUR POINT HYDROCARBON LUBRICATING OILS

Charles Woo, Sarnia, Canada, assignor to Exxon Research and Engineering Company, Linden, N.J.

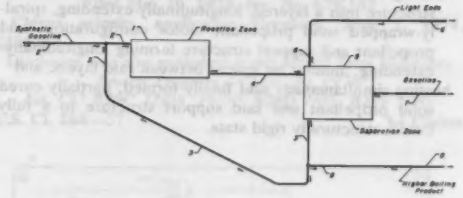
Filed July 16, 1975, Ser. No. 596,308
Int. Cl.² C07C *3/20*
U.S. Cl. 260—676 R **5 Claims**

1. A process for the preparation of a synthetic hydrocarbon lubricating oil having a viscosity of less than 100 SUS at 100° F. and a pour point of −40° F. or less, which comprises the polymerization of aliphatic alpha-olefins of from about 5 to 20 carbon atoms at a polymerization temperature in the range of from about 300° to 800° F. for from about 1 to 20 hours in the presence of from about 0.5 to 20 weight percent of a silica-alumina molecular sieve acidic catalyst, fractionating to obtain a fraction boiling within the range of about 550° to 800° F., and then hydrofining said fraction to thereby form said lubricating oil.

4,013,737
UPGRADING SYNTHETIC GASOLINE

Dennis J. Ward, South Barrington, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed June 16, 1975, Ser. No. 587,467
Int. Cl.² C07C 5/24
U.S. Cl. 260—683.2 7 Claims



1. A process for improving low octane number gasoline synthesized from carbon monoxide and hydrogen, having an initial boiling point of about 110° F. and an end boiling point of about 480° F. and containing straight-chain olefins of from 5 to 14 carbon atoms per molecule, which process comprises contacting said gasoline with a solid phosphoric acid catalyst at a temperature of from about 300° F. to about 700° F., a pressure of from about 20 to about 60 atmospheres and a rate of feed of 0.1 to 50 volumes/hour of gasoline per volume of catalyst, and recovering the resultant higher octane olefin-containing hydrocarbon product.

4,013,738
HYDROCARBON ISOMERIZATION PROCESS

Ernest L. Pollitzer, Skokie, and John C. Hayes, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 522,209, Nov. 8, 1974, Pat. No. 3,960,710. This application Nov. 20, 1975, Ser. No. 633,889
Int. Cl.² C07C 5/22
U.S. Cl. 260—683.2 14 Claims

1. A process for isomerizing a C_4 to C_{20} olefin which comprises contacting said olefin at isomerization conditions including a temperature of 0° to 245° C, a pressure of atmospheric to 100 atmospheres, and a liquid hourly space velocity of 0.1 to 10 with a catalyst comprising a porous carrier material containing, on an elemental basis, 0.01 to 2 wt.% platinum group metal, 0.1 to 5 wt.% cobalt, 0.01 to 5 wt.% tin and 0.1 to 10 wt.% halogen, wherein substantially all of the platinum group metal, cobalt and tin are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum group metal and cobalt are present in the elemental metallic state and wherein substantially all of the tin is present in an oxidation state above that of the elemental metal.

4,013,739
POSTTREATMENT OF COPOLYMER OF STYRENE AND ACRYLONITRILE

William J. I. Bracke, Hamme, and Jacqueline Brandli, Brussels, both of Belgium, assignors to Labofina S.A., Brussels, Belgium

Division of Ser. No. 553,610, Feb. 27, 1975. This application Jan. 9, 1976, Ser. No. 647,772
Claims priority, application Belgium, Oct. 24, 1974, 149845
Int. Cl.² C08L 9/00
U.S. Cl. 260—880 R 3 Claims

1. A process for producing a copolymer of styrene and acrylonitrile partially grafted to an elastomeric polymer and substantially free of acrylonitrile which comprises copolymerizing styrene and acrylonitrile in the presence of a butadiene elastomer and treating the resulting copolymer at a temperature of between 100° and 110° C. with an aqueous solution of a sulphur compound selected from the group consisting of alkaline sulfides and alkaline disulfides, the amount of said sulphur compound used being such as to correspond to 25 to 100% of the stoichiometric amount required to react with the residual acrylonitrile in said copolymer.

4,013,740
SUBSTITUTED FLUOROPHOSPHAZENES

Heinrich Adolphi, Limburgerhof; Gerd Wunsch, Speyer, and Volker Kiener, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 1, 1974, Ser. No. 484,437
Claims priority, application Germany, July 10, 1973, 2334917
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² C07C 9/15; A01N 9/36
U.S. Cl. 260—927 N 11 Claims

1. A substituted fluorophosphazene of the formula

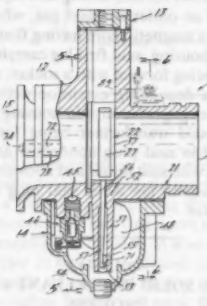
$$N_3P_3F_zZ_{6-z},$$

where Z denotes OR or SR, wherein R denotes lower alkyl and *n* denotes one of the integers 2, 3, or 4.

4,013,741
CARBURETOR

William H. Edmonston, Lake Isabella, Calif., assignor to Lectron Products, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 563,594, March 31, 1975. This application May 30, 1975, Ser. No. 582,430
Int. Cl.² F02M 9/06
U.S. Cl. 261—44 R 6 Claims



1. A carburetor comprising a body with inlet and outlet ends, a throat extending through said body from one end to the other, a throttle slide in said body extending transversely to the throat at an intermediate portion thereof, said slide being movable to vary the unblocked portion of said throat, said slide comprising a thin flat member of substantially rectangular shape having a central enlargement on the downstream face thereof, the slide being thin from said enlargement outwardly to its side edges, the height of said slide being only slightly greater than the height of said throat, said enlargement being in the path of said throat, the lower edge of said slide having a centrally disposed downwardly open concave recess, the bottom of said enlargement being spaced above the upper central portion of said concave recess, a fuel tube extending transversely to said throat and having an opening into said throat concentric with said recess, a pin disposed in said tube and having fuel metering means associated therewith at one side thereof downstream of said slide for regulating flow of fuel from said passage into the stream of air traversing said throat, one end of said pin extending into said tube, means mounting the other end of said pin in said enlargement so that the pin extends downwardly therefrom past said recess, the pin being centrally disposed with respect to the recess

whereby the widest portion of said recess is aligned with said pin, the end of said fuel tube adjacent said throat being flush with the throat whereby air may pass through the entire space between said recess and said throat past said pin.

4,013,742

DEVICE FOR WETTING AND HEATING GASES, PREFERABLY BREATHING GASES IN RESPIRATORS

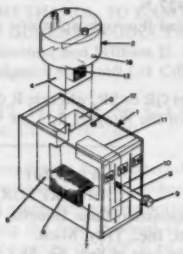
Volker Lang, 8012 Spitzwegstr, 63 b, Ottobrunn, Germany

Filed July 28, 1975, Ser. No. 599,478

Claims priority, application Germany, July 29, 1974, 2436406

Int. Cl.² B01F *3/04*; A61M *15/00*

U.S. Cl. 261—130 **10 Claims**



1. Humidifying and heating apparatus for respiratory gas, comprising a transformer for inductively heating a humidifying liquid, and a vessel for containing said liquid and provided with an inlet and an outlet for said gas, wherein said transformer comprises a magnetic core having first and second legs and disposed in a housing, said first leg carrying a primary coil and said housing being formed with a socket, and wherein said vessel comprises a depending extension defining a plug connector releasably engageable in said housing socket, a secondary winding of said transformer being formed by a plate which is mounted in said plug connector and has an upper portion in contact with said liquid and a lower portion adapted to straddle said second leg when said plug connector is engaged in said socket.

4,013,743

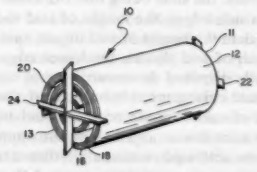
SPIRAL GRAIN SOLID PROPELLANT FABRICATION PROCESS

Thomas L. Blasche, Jr.; Donald D. Kobbeman, and Boyce M. Corley, all of Waco, Tex., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 12, 1973, Ser. No. 331,404

Int. Cl.² C06B *21/00*

U.S. Cl. 264—3 R **5 Claims**



1. A method of fabricating a spirally wound, solid propellant motor grain with a support structure therein, the improvement comprising the steps of:

spreading a layer of uncured solid propellant onto both sides of a support structure, said solid propellant being an ammonium perchlorate oxidized composition containing a binder system that cures at a relatively high temperature, said support structure being a flexible, uncured, reinforced fabric tape with a thermosetting resin binder thereon that cures at a relatively high temperature,

partially curing said uncured solid propellant applied to both sides of said uncured flexible support structure to a gelled state,

forming said partially cured solid propellant and support structure into a layered, longitudinally-extending, spirally-wrapped solid propellant motor configuration, said propellant and support structure forming longitudinally-extending, annular air spaces between said layers, and

heating simultaneously said finally formed, partially cured solid propellant and said support structure to a fully cured, structurally rigid state.

4,013,744

PROCESS FOR THE MANUFACTURE OF FIBRIDS OF THERMOPLASTICS MATERIALS

Heribert Kuerten, Mannheim; Otto Nagel, Neustadt; Richard Sinn, Ziegelhausen; Werner Weinle, Mannheim, and Peter Engler, Frankenthal, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

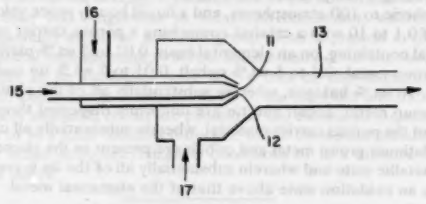
Filed Feb. 26, 1973, Ser. No. 335,783

Claims priority, application Germany, Feb. 25, 1972, 2208921

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B01J *2/06*

U.S. Cl. 264—11 **7 Claims**



1. A process for the manufacture of fibrids of a thermoplastic polymer material which comprises extruding strands of molten thermoplastic polymer material through orifices of die means into a shear gradient zone between and created by a propulsive jet of liquid flowing from a nozzle adjacent said die means at a velocity of 10–100 meters per second and flowing in the same direction as said strands and a slower moving liquid body entrained by the propulsive jet and located in a liquid-filled zone surrounding said orifices and the propulsive jet, passing said strands, the propulsive jet and the entrained liquid immediately and directly into and through a tubular impulse exchange zone having a mean diameter of two to 20 times the diameter of said nozzle of said propulsive jet and a length of 2–30 times its hydraulic diameter to provide shear stresses acting on said strands within said impulse exchange zone, and causing said strands of molten thermoplastic polymer to solidfy by the cooling of said melt by said liquid and to be broken up into fibrids by said shear stresses within said impulse exchange zone.

4,013,745

PROCESS FOR THE EXTRUSION OF A PLASTIC FOIL HAVING SMALL VARIATIONS IN THICKNESS

Hans Brinkmann; Gottfried Eisele; Helmut Gormar, all of Troisdorf; Horst Pabst, Bonn-Beuel; Helmut Putz, Troisdorf; Hans Jurgen Schrick, Troisdorf, and Uwe Sommermeyer, Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

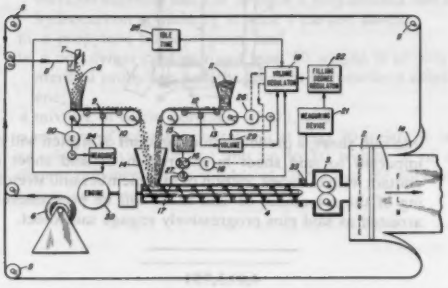
Filed May 20, 1975, Ser. No. 579,153

Claims priority, application Germany, June 1, 1974, 2426714

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B29C *17/08, 29/00;* B29D *7/02;* B29F *3/00*

U.S. Cl. 264—37 14 Claims



1. A process for extruding a film from materials including virgin polymer and returned scrap, said film having small variations in thickness, comprising:

feeding virgin polymer to an extruder screw inlet and measuring the feed rate thereof;

moving said virgin polymer and returned scrap through an extruder screw press and then moving said materials at a constant rate from the screw press and through a pump having a constant volume output per unit of time;

then extruding said materials through a sheeting die, forming film;

severing margins of said film and recycling the severed margins as scrap to said screw inlet;

measuring the weight per unit time of recycled material returned to said screw inlet;

subtracting the measured quantity of said severed margins from a nominal feed rate for said extruder and controlling the rate at which virgin polymer is fed according to differences between the amount of scrap returned and the nominal feed rate; and

maintaining the pressure constant at an inlet to said constant volume pump.

4,013,746

METHODS OF MANUFACTURE OF SEMICONDUCTOR BODIES

Kenneth A. Goreham, London, and John R. Perry, Daventry, both of England, assignors to Smiths Industries Limited, London, England

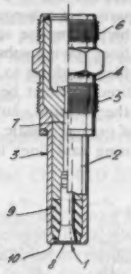
Filed Apr. 21, 1975, Ser. No. 570,328

Claims priority, application United Kingdom, May 2, 1974, 19282/74

Int. Cl.² C04B *35/56*

U.S. Cl. 264—66 16 Claims

1. In a known method of manufacturing a semiconductor body, comprising the step of compacting a mixture containing particulate silicon carbide and the step of sintering said mixture, said mixture including a non-conductive silicate material to provide a nonconductive silicate matrix for said silicon-carbide particles during said sintering step, the improvement wherein the said mixture is heated to coat said silicon carbide with nonconductive silicate matrix material, milling said



coated silicon carbide, and compacting said coated silicon carbide.

4,013,747

METHOD FOR MAKING SPECTACLE FRAME COMPONENTS

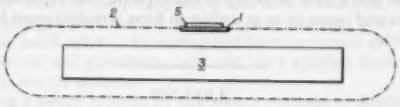
Gerald Hampel, Vienna, Austria, assignor to Optipatent AG, Zug, Switzerland

Continuation-in-part of Ser. No. 689,952, Dec. 12, 1967, abandoned. This application Aug. 20, 1970, Ser. No. 65,654

Claims priority, application Germany, Dec. 22, 1966, 1604419

Int. Cl.² B29C *9/00;* C08G *51/04*

U.S. Cl. 264—73 15 Claims



11. A method of coloring epoxy resin eyeglass frames and parts thereof manufactured from liquid ingredients, an epoxy composition and a hardener, comprising the steps of

adding small amounts of a coloring agent selected from azo dyes and pigmenting material to at least one of the liquid ingredients prior to casting the liquid ingredients,

metering the liquids into a mold having cavities therein in the form of eyeglass frames and parts thereof,

completely curing the liquid ingredients and included coloring agent in the mold to produce a self-sustaining, completely polymerized colored eyeglass frames or parts thereof,

removing the colored polymerized eyeglass frames or parts thereof from the mold, and

subjecting selected portions of the colored polymerized eyeglass frames or parts thereof to heat to chemically bleach selected areas of the frame and parts thereof to produce demi-shades in the colored polymerized eyeglass frames or parts thereof.

4,013,748

METHOD FOR MAKING COMPOSITE PLASTIC ARTICLE

Emery I. Valyi, 5200 Sycamore Ave., Riverdale, N.Y. 10471

Continuation-in-part of Ser. No. 213,914, Dec. 30, 1971, abandoned. This application July 2, 1973, Ser. No. 375,824

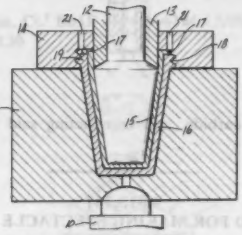
The portion of the term of this patent subsequent to Mar. 6, 1990, has been disclaimed.

Int. Cl.² B29C *17/07;* B29D *3/00*

U.S. Cl. 264—90 14 Claims

1. In the process of forming a composite plastic article from

a parison having at least two layers of material wherein the parison is formed on a core in a parison mold by molding the organic plastic material around the core in the parison mold cavity and wherein the parison is subsequently expanded in a blow mold, the steps which comprise applying a preformed liner to said core, said liner having substantially continuous side and end portions which conform to the sides and end of the core and prevent direct contact between the core and plastic being molded therearound, subsequently pressure molding an outer layer of organic plastic material around said liner substantially enclosing said liner to form a composite



parison by injecting plastic into said mold cavity around said core and liner and causing the injected plastic to fill the space therearound in a manner such that substantially all air in said mold cavity in the space between said core and liner and between the liner and the injected plastic is forced toward the portion last to be filled, venting such air from said portion, bringing said liner to a temperature at which it is capable of being expanded together with said outer layer, at least in part by means of said outer layer, introducing said liner and outer layer into a blow mold in said heated state, and expanding said liner and outer layer in unison to form a multilayered hollow article.

4,013,749

METHOD OF SHAPING FIBER MATERIALS

Sten Thore Henriksson, Erik Sjobloms vag 8, S-890 23 Sjalevad, Sweden

Filed June 24, 1975, Ser. No. 589,956

Int. Cl.² B29J 5/02

U.S. Cl. 264—128 **4 Claims**

1. A method for producing compressed boards by hot pressing which comprises

a. treating wood chips with an aqueous solution of

1. water glass, and

2. a compound capable of liberating acetic acid under the conditions of hot pressing,

b. hot pressing said treated wood chips under temperature conditions sufficient to cause liberation of acetic acid,

whereby the acetic acid liberated during hot pressing causes gelation of the water glass, which in turn causes binding of the hot pressed wood chips to take place.

4,013,750

METHOD FOR MAKING BRASSIERE PAD PREFORMS

Herbert Magidson; Otto L. Huber, both of Beverly Hills, and Helmut Hennrich, Manhattan Beach, all of Calif., assignors to Moldex/Metric, Inc., Culver City, Calif.

Division of Ser. No. 473,735, May 28, 1974, Pat. No. 3,947,207. This application June 9, 1975, Ser. No. 585,235

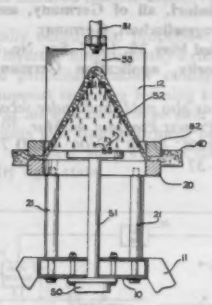
Int. Cl.² B29C 11/00

U.S. Cl. 264—136 **7 Claims**

1. A method of preforming seamless brassiere pads fabricated from sheet fibrous batting material which comprises:

a. clamping said sheet of fibrous batting material at the periphery of said pad; and

b. driving a substantially conical member into said sheet, said conical member having a plurality of pins extending from the surface of said member and aligned in the direction of motion of said member said pins being distributed over substantially all of the surface of said member with the exception of an area surrounding the apex of said member whereby when said conical member is driven



into said sheet, a predetermined amount of stretch will be imparted to said sheet in the region of said member and stretching of the remainder of said sheet will be progressively arrested as said pins progressively engage said sheet.

4,013,751

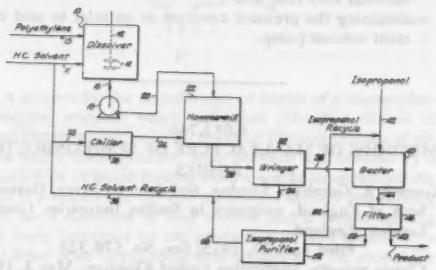
FIBRILS AND PROCESSES FOR THE MANUFACTURE THEREOF

Joseph C. Davis, DeSoto, Kans.; Francis R. Galiano, Beaumont, Tex., and Robert W. Hill, Gibsonia, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 193,716, Oct. 29, 1971, abandoned, and Ser. No. 202,302, Nov. 26, 1971, abandoned, and Ser. No. 211,562, Dec. 23, 1971, abandoned, and Ser. No. 234,321, March 13, 1972, abandoned, and Ser. No. 236,189, March 20, 1972, abandoned, and Ser. No. 238,463, March 27, 1972, abandoned, and Ser. No. 254,456, May 18, 1972, abandoned, and Ser. No. 256,718, May 25, 1972, abandoned, and Ser. No. 287,494, Sept. 8, 1972, abandoned, and Ser. No. 322,317, Jan. 10, 1973, abandoned, and Ser. No. 322,327, Jan. 10, 1973, abandoned, and Ser. No. 322,592, Jan. 10, 1973, abandoned. This application June 14, 1974, Ser. No. 479,357

Int. Cl.² B01J 2/06

U.S. Cl. 264—140 **17 Claims**



1. A process for producing a mass of entangled solvent swollen filaments from a high molecular weight polymer consisting essentially of the sequential steps of:

a. dissolving said polymer in a solvent at a temperature above 100° C. to prepare a solution thereof having a viscosity of at least about 50 centipoises;

b. subjecting said heated polymer solution to shearing forces and attenuating said solution into liquid streams to

orient the solute polymer molecules in said liquid streams while maintaing said polymer solution at a temperature sufficiently high to maintain substantially all of said polymer in solution,

c. feeding said liquid streams into a cooling zone in which said streams are cooled to a temperature to precipitate substantially all of said solute polymer as solvent swollen polymer filaments; and

d. recovering said polymer as a mass of entangled solvent swollen filaments from said solvent;

said polymer being selected from the group consisting of:

1. an olefin polymer having an inherent viscosity of at least 3.5 and selected from the group consisting of:
   i. an ethylene homopolymer,
   ii. a copolymer containng at least 90 weight % of polymerized ethylene and the balance a polymerized olefin hydrocarbon containing at least 4 carbon atoms,
   iii. a propylene homopolymer, and
   iv. a copolymer containing at least 50 weight % of polymerized propylene and the balance polymerized ethylene;
2. a mixture of olefin polymers of (1), and
3. a mixture of polymers containing at least 20 weight % of an olefin polymer of (1) and up to 80 weight % of a diluent polymer that is soluble at 100° C. in the solvent employed in step (a).

4,013,752

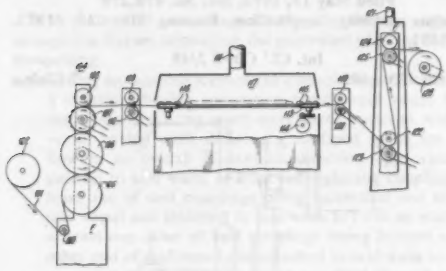
METHOD OF MANUFACTURING RETICULATE SHEET MATERIAL

Frank Kalwaites, Somerville, and Peter L. Doviak, South Brunswick, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 54,961, July 15, 1970, Pat. No. 3,666,609. This application Feb. 9, 1972, Ser. No. 182,561

Int. Cl.² B28B *1/48;* **D01D** *5/20*

U.S. Cl. 264—154 **7 Claims**



1. A method for manufacturing a reticulate, polymer, sheet having a set of filaments extending across the sheet and intersecting in molecularly oriented integral junctures with a second set of filaments comprising:

1. Heating a film of molecularly orientable, thermally stable, oxidation resistant synthetic polymer;
2. Embossing said heated film to form a net like structure of substantially unoriented ribs and junctures which define a uniform pattern of openings throughout the structure, said ribs and junctures having substantially uniform cross-sectional areas throughout the structure; and
3. Stretching the embossed film in the longitudinal direction at a ratio of at least 3:1 and in the transverse direction at a ratio of at least 4:1 so that the total area stretch of the structure is from 12:1 to 40:1, whereby the ribs and junctures are substantially uniformly molecularly oriented throughout said sheet.

4,013,753

PROCESS FOR THE PRODUCTION OF SPONTANEOUSLY CRIMPING POLYACRYLONITRILE COMPOSITE FIBRES WITH IMPROVED CRIMP PROPERTIES

Hermann Lohwasser; Alfred Nagaj, and Horst Wieden, all of Dormagen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 30, 1974, Ser. No. 510,576

Claims priority, application Germany, Oct. 9, 1973, 2350632

Int. Cl.² D01D *5/22*

U.S. Cl. 264—168 **7 Claims**

1. A process for the production of spontaneously crimping polyacrylonitrile composite fibers which comprises side-by-side spinning of two different acrylonitrile polymers in dimethylformamide solution by the dry-spinning process , stretching the fibers which still contain dimethyl-formamide to at least three times their original length in a bath of hot water which contains from 12 to 30%, by weight, of dimethylformamide, and drying the stretched fibers under tension or under conditions of partial shrinkage.

4,013,754

STATIC LEACHING COPPER ORE

John C. Stauter, and Gerald F. Pace, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed June 12, 1973, Ser. No. 369,379

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C01G *3/00;* **C22B** *3/00*

U.S. Cl. 423—27 **5 Claims**

2. A process for static leaching copper mineral values from a source material comprising sizing said source material,

contacting a first portion of said source material with an acid leach solution by adding said solution to said source material and percolating said acid leach solution through said source material,

adding a sweep solution to said source material to displace said acid leach solution,

recovering an effluent pregnant leach liquor from said source material,

segregating the first portion of effluent pregnant leach liquor forming a first portion of concentrated pregnant leach liquor from the last portion of said effluent leach liquor forming a first portion of recycle leach liquor,

contacting a second portion of said source material with said recycle acid leach solution by adding said recycle leach liquor to said source material and percolating said leach liquor through said source material,

adding a sweep solution to said source material to displace said acid leach solution,

recovering an effluent pregnant leach liquor from said source material, and

segregating the first portion of effluent pregnant leach liquor forming a second portion of concentrated pregnant leach liquor from the last portion of said effluent leach liquor forming a second portion of recycle leach liquor.

4,013,755

FILTRATION OF SOLID-CONTAINING TITANYL SULFATE SOLUTIONS

Raoul Weiler, Berchem; Joël Leuridan, Antwerp, and Jozef Renier, Kapellen, all of Belgium, assignors to Bayer Antwerpen N.V., Antwerpen, Belgium

Filed Nov. 5, 1975, Ser. No. 628,877

Claims priority, application Germany, Nov. 15, 1974, 2454220

Int. Cl.² C01G *23/00, 23/04*

U.S. Cl. 423—82 **2 Claims**

1. In the production of a solid-free solution of titanyl sulfate by digesting ilmenite or titanium slag with sulfuric acid, re-

moving the non-digested particles from the solid-containing solution and filtering the solid-containing solution of titanyl sulfate to separate the solids, the improvement which comprises applying a filter aid to a membrane filter to form a coating thereon, adding a filter aid to the solid-containing solution of titanyl sulfate, filtering the solution in same membrane filter at a temperature of about 60 to 90° C and under a pressure of about 4 to 16 bars to form a filter cake of a thickness of about 10 to 35 mm, washing the filter cake with about 0.1 to 0.5 m^3 of wash liquid per m^3 of filtrate at a flow rate of about 0.1 to 1.2 m/h under a pressure of about 1 to 16 bars and squeezing the filter cake after washing to a solid content of about 50 to 70% by weight.

4,013,756

PROCESS FOR PREPARING PHOSPHINE

Edward James Lowe, Stourton, near Stourbridge, and Frederick Arthur Ridgway, Stourbridge, both of England, assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 188,604, Oct. 12, 1971, Pat. No. 3,861,882, which is a continuation of Ser. No. 599,915, Dec. 7, 1966, abandoned. This application Nov. 29, 1974, Ser. No. 528,583

Int. Cl.² C01B *25/01, 25/02, 25/04*

U.S. Cl. 423—299 **6 Claims**

1. A method for preparing phosphine which comprises quenching a vapor comprising P_2 molecules with a liquid at a temperature below the solidification point of red phosphorus, the reacting the thus formed red phosphorus at a temperature in excess of 250° C with water in the presence of sufficient phosphorus pentoxide to maintain the system in the liquid state at atmospheric pressure.

4,013,757

HIGH PRESSURE THERMAL HYDROLYSIS PROCESS TO DECOMPOSE TRIAZINES IN ACID WASTE STREAMS

Sidney Berkowitz, Highland Park, and Charles V. Juelke, Belle Meade, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Apr. 17, 1975, Ser. No. 569,019

Int. Cl.² C01C *1/08*

U.S. Cl. 423—358 **3 Claims**

1. A process for treating an acid waste stream having a pH of from about 0 to about 6 and containing a triazine ring compound selected from the group consisting of cyanuric acid, melamine, ammeline and ammelide, to effect decomposition of said triazine ring compound into the decomposition products ammonia and carbon dioxide, which comprises heating said acid waste stream at a temperature of from about 225° to about 275° C under the autogenously developed pressure for a time of from about one to about 15 minutes, until decomposition of said triazine ring compound into said decomposition products is effected, and recovering a waste stream having no detectable amount of said triazine ring compound.

4,013,758

PROCESS FOR PREPARING HYDRAZINES

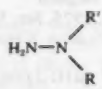
Hans Osborg, 80 Longview Road, Port Washington, N.Y. 11050

Filed Aug. 7, 1975, Ser. No. 602,837

Int. Cl.² C07C *109/00*

U.S. Cl. 423—407 **16 Claims**

1. A process for preparing hydrazines of the formula:



wherein R and R′ are each selected from hydrogen, phenyl and lower alkyl, provided that when one of R and R′ is phenyl, the other of R and R′ is hydrogen, which comprises;

a. providing a reaction mixture consisting essentially of equimolar proportions of the corresponding amine compound of formula:

wherein X is selected from chlorine or bromine; a corresponding amide selected from the group consisting of an alkali metal amide and an alkaline earth amide; and from about 50 to about 1,000 percent by weight of the amide, of an inert, non-aqueous carrier solvent for at least one of said amide and said amine, which is a liquid at temperatures within the range of from about −110° to about 200° C.;

b. reacting said amine compound with said amide compound in said reaction mixture, at a temperature of from 0° to about −50° C.; and

c. separating the desired hydrazine compounds from the resulting reaction mixture.

4,013,759

ACETYLENE-LIKE BLACK AND PROCESS

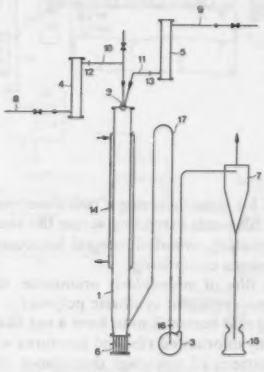
Claude Giet, La Barthe de Neste, France, assignor to Societe Anonyme: Produits Chimiques Ugine Kuhlmann, Paris, France

Filed May 15, 1974, Ser. No. 470,279

Claims priority, application France, May 15, 1973, 73.17581

Int. Cl.² C09C *1/48*

U.S. Cl. 423—445 **7 Claims**



1. A carbon black having an electrical resistivity, measured under a pressure of 6.3 bars, in the range of 0.4 to 0.7 ohm/cm and a carbon content higher than 99%, having an adsorption capacity for water of filter index of at least about 80 gm of 3% acetonic water for 5 gm of carbon black, a particle size, measured by nitrogen adsorption, of less than about 200 A and a surface area in the range of 85 to 115 m^2/gm.

4,013,760
PROCESS FOR THE PRODUCTION OF ISOTROPIC PYROLYTIC CARBON PARTICLES

Hans Huschka, Grossauheim, and Franz-Josef Herrmann, Rodenbach, both of Germany, assignors to HOBEG Hochtemperaturreaktor-Brennelement GmbH, Grossauheim, Germany

Filed July 11, 1974, Ser. No. 487,786

Claims priority, application Germany, July 30, 1973, 2338562

Int. Cl.² C01B *31/02, 31/04*

U.S. Cl. 423—449 **9 Claims**

1. A process of producing isotropic pyrolytic carbon particles of high heat conductivity comprising pyrolyzing a hydrocarbon gas on isotropic carbon granulates to form a deposit of isotropic pyrolytic carbon on the isotropic carbon granulates having a particle size above 100μm and then grinding to form an isotropic carbon powder having a particle size below 100μm and an average particle size larger than 5 μm.

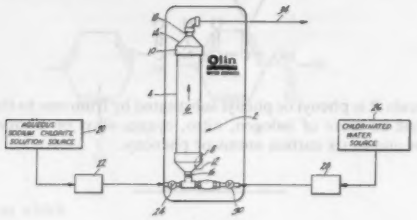
4,013,761
CHLORINE DIOXIDE GENERATION

William J. Ward, Lenexa, and Kenneth E. Gasper, Overland Park, both of Kans., assignors to Olin Corporation, New Haven, Conn.

Filed Jan. 23, 1976, Ser. No. 651,685

Int. Cl.² C01B *11/02*

U.S. Cl. 423—477 **13 Claims**



6. A method of generating chlorine dioxide and supplying an aqueous stream containing the generated chlorine dioxide, comprising:

i. feeding an aqueous sodium chlorite solution to the inlet of a chlorine dioxide generation vessel, said vessel being made of an oxidizing agent-inert plastic material, and said vessel having walls defining a confined space for fluid flow in an overall mean flow direction approximately parallel to said walls; at least two reducing couplings, at least one of said couplings being located at one end of said vessel and attached to said walls to form an inlet and at least one other of said couplings being located at the other end of said vessel and attached to said walls to form an outlet, said couplings being attached to said vessel walls by solvent weld, said couplings having surfaces which reduce the cross-sectional area of said confined space defined by said vessel walls, said coupling surfaces forming an angle of at least 110° with said vessel walls; said aqueous sodium chlorite solution being fed to the inlet by metering the aqueous sodium chlorite solution from an aqueous sodium chlorite solution source to said inlet via an injection check valve;

ii. feeding an aqueous sodium hypochlorite solution to said inlet by metering the sodium hypochlorite solution through an injection check valve to said inlet at a rate of about 0.4 to about 1.0 moles of sodium hypochlorite per mole of sodium chlorite;

iii. feeding a mineral acid to said inlet by metering the mineral acid through an injection check valve to said inlet at a rate of about 0.10 to about 1.0 moles of mineral acid per mole of sodium chlorite;

iv. mixing and reacting said sodium chlorite solution, said sodium hypochlorite solution and said mineral acid in said vessel and minimizing the heat buildup resulting from the exothermic reaction by feeding a water stream to said vessel; and

v. withdrawing from the outlet of said vessel an aqueous stream containing chlorine dioxide reaction product.

4,013,762
GROWTH PROMOTION

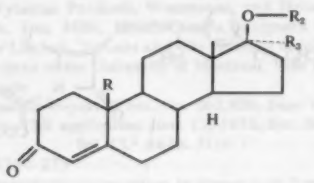
Harvey D. Benson, Cincinnati; Joyce Francis Grunwell, Hamilton; John O'Neal Johnston, Cincinnati, all of Ohio, and Vladimir Petrow, Chapel Hill, N.C., assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed May 10, 1976, Ser. No. 684,947

Int. Cl.² A61K *31/56*

U.S. Cl. 424—242 **11 Claims**

1. A method of promoting the growth of poultry and ruminants which comprises administering thereto a growth promoting effective amount of a compound of the formula:



wherein R is —CHO or —CH_2OR_1; each of R_1 and R_2 is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 1 to 20 carbon atoms and is straight or branched, benzoyl, phenylalkylcarbonyl wherein the alkyl moiety has from 1 to 6 carbon atoms and is straight or branched or cycloalkylcarbonyl wherein the cycloalkyl moiety has from 5 to 10 carbon atoms; R_3 is hydrogen; or R_2 and R_3 together form a double bond between the 17- position carbon atom and the oxygen atom.

4,013,763
HETEROCYCLIC COMPOUNDS

Yutaka Kuwada; Kanji Meguro; Hideaki Natsugari; Yoshiaki Sato, all of Hyogo, and Hiroyuki Tawada, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

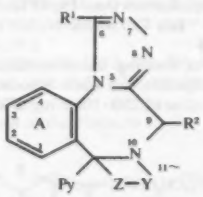
Filed July 3, 1975, Ser. No. 592,814

Claims priority, application Japan, July 12, 1974, 49-80646; July 25, 1974, 49-85787

Int. Cl.² C07D *491/22*

U.S. Cl. 424—246 **27 Claims**

1. A heterocyclic compound of the general formula



wherein R^1 represents a hydrogen atom or a straight chain alkyl, branched alkyl or cyclic alkyl, said alkyl groups having up to 6 carbon atoms, a benzyl, phenethyl, phenyl, tolyl or naphthyl group; R^2 represents hydrogen atom or a lower alkyl group having 1 to 4 carbon atoms; Py represents a pyridyl group; Y represents an ethylene or a trimethylene group which may have lower alkyl group as substituent; Z represents

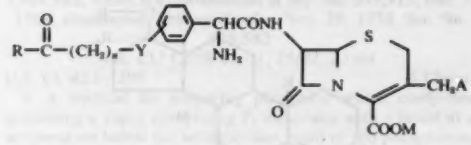
an oxygen atom, a sulfur atom or —NH-group; and the ring A is either unsubstituted or substituted by a halogen atom, nitro, alkyl, alkoxy or trifluoromethyl group, said alkyl or alkoxy group containing from 1 to 4 carbon atoms.

4,013,764
PHARMACEUTICAL COMPOSITIONS COMPRISING SUBSTITUTED PHENYLGLYCYLCEPHALOSPORINS AND METHODS OF TREATING BACTERIAL INFECTIONS

John Gerald Gleason, Cornwells Heights, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 384,771, Aug. 1, 1973, Pat. No. 3,953,439. This application Dec. 15, 1975, Ser. No. 640,999
Int. Cl.² A61K *31/54*
U.S. Cl. 424—246 **14 Claims**

8. A method of treating bacterial infections comprising administering by injection to a warm-blooded animal a pharmaceutical composition comprising an effective but non-toxic dose of 250 to 1000 mg of a compound of the formula:



in which:

Y is O, NH or S;

n is 1 to 5;

R is NH_2 or OR′, where R′ is hydrogen or lower alkyl of from one to four carbon atoms;

M is hydrogen or an alkali metal or ammonium cation;

A is SHet and

Het is a five or six membered heterocyclic group containing carbon and one to four atoms selected from the group consisting of N, O and S, each such group being unsubstituted or substituted with from one to two groups selected from lower alkyl, alkoxyalkyl, each alkoxy or alkyl having from one to four carbon atoms, hydroxy, trifluoromethyl and SR′, where R′ is hydrogen or alkyl of from 1 to 4 carbon atoms,

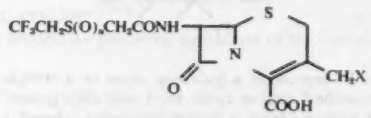
and a pharmaceutically acceptable carrier therefor.

4,013,765
COMPOSITIONS AND METHODS FOR TREATING BACTERIAL INFECTIONS WITH SUBSTITUTED ACETAMIDOCEPHALOSPORINS

Robert M. DeMarinis, King of Prussia, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 428,536, Dec. 26, 1973, Pat. No. 3,957,770. This application Dec. 29, 1975, Ser. No. 644,475
Int. Cl.² A61K *31/54*
U.S. Cl. 424—246 **20 Claims**

11. A method of treating bacterial infections comprising administering by injection to a warm-blooded animal an effective but non-toxic dose of 250–1000 mg of a compound of the formula



where

n is 0, 1, or 2;

X is SHet; and

Het is a 5 or 6-membered heterocyclic ring containing carbon and 1–4 atoms selected from the group consisting of N, O, and S, unsubstituted or substituted with one or two substituents selected from the group consisting of alkyl of C_1–C_6, alkoxy of C_1–C_6, allyloxy, oxide, halogen, carbamyl, carboxyl, carbalkoxy of C_1–C_6, mercapto, methylthio trifluoromethyl, hydroxy, amino, alkylamino and dialkylamino, each undefined alkyl having 1–6 carbon atoms

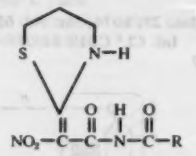
or a non-toxic pharmaceutically acceptable salt thereof.

4,013,766
N-(NITRO(TETRAHYDRO-2H-1,3-THIAZIN-2-YLIDENE)ACETYL)BENZAMIDES

Steven A. Roman, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 26, 1976, Ser. No. 670,765
Int. Cl.² C07D *279/06*; A61K *31/54*
U.S. Cl. 424—246 **3 Claims**

1. A compound of the formula:



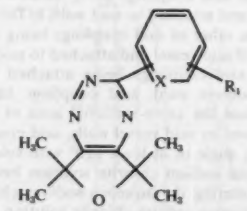
wherein R is phenyl or phenyl substituted by from one to three of one or more of halogen, nitro, cyano, alkyl or alkoxy of from one to six carbon atoms or phenoxy.

4,013,767
3-PYRIDYL AND PYRIDYL-N-OXIDE-FURO[3,4-E]-AS-TRIAZINES

Gregory B. Bennett, Mendham, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed Aug. 15, 1975, Ser. No. 605,069
Int. Cl.² C07D *253/08*; A61K *31/53*
U.S. Cl. 424—249 **9 Claims**

1. A compound of the formula



wherein

R_1 represents hydrogen, halo having an atomic weight of about 19 to 36, lower alkyl, straight chain lower alkoxy, or trifluoromethyl and

X represents N or N → O,

provided that when R_1 represents t-butyl or trifluoromethyl, R_1 and the triazine ring are on other than adjacent carbon atoms,

or a pharmaceutically acceptable salt thereof.

4,013,768

PYRIMIDIN-6-yl ACETHYDROXAMIC ACIDS, THEIR THERAPEUTIC APPLICATION AND THEIR PROCESS OF PREPARATION

Claude P. Fauran, Paris; Jeannine A. Eberlé, Chatou; Guy R. Bourgery, Colombes; Guy M. Raynaud, Paris, and Claude J. Gouret, Meudon, all of France, assignors to Delalande S.A., Courbevoie, France

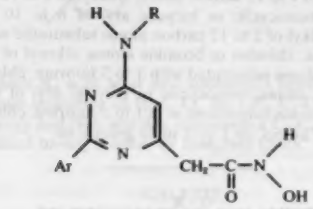
Filed Mar. 3, 1975, Ser. No. 554,532

Claims priority, application France, Mar. 19, 1974, 74.09235

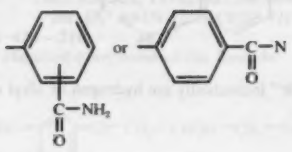
Int. Cl.² C07D *239/26*

U.S. Cl. 424—251 12 Claims

1. A compound having the formula



wherein R is



in which

—N

is pyrrolidino or piperidino, and Ar is phenyl substituted by one chloro, one fluoro, one trifluoromethyl, one methylenedioxy or by one or more methoxy,

or the hydrachloric acid addition salt thereof.

12. A composition for treating a condition of circulatory insufficiency, gastro-duodenalulcers, respiratory insufficiency, hypertension, edema, depression, pain, inflammation or cerebral deficit, comprising an effective amount of a compound as claimed in claim 1 for treating the condition, together with a therapeutically acceptable carrier.

4,013,769

PYRIDYL-ALKYLAMINOETHYLENE COMPOUNDS

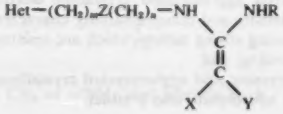
Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote; Charon Robin Ganellin, Welwyn Garden City, and Hunter Douglas Prain, Welwyn, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

Continuation-in-part of Ser. No. 468,617, May 9, 1974, Pat. No. 3,953,460. This application Nov. 5, 1975, Ser. No. 629,194

Int. Cl.² A61K *31/44*; C07D *213/28*

U.S. Cl. 424—263 9 Claims

1. A compound of the formula:



wherein X and Y, which may be the same or different, are hydrogen, nitro, cyano or SO_2Ar but are not both hydrogen or both nitro; R is $Het'(CH_2)_m Z'(CH_2)_n$; Z and Z′ are —S— or methylene; m and m_1 are 0, 1 or 2 and n and n_1 are 2 or 3, provided that each of the sum of m and n and the sum of m_1 and n_1 is 3 or 4; Het is a pyridine ring which ring is optionally substituted by lower alkyl, hydroxyl, halogen or amino; Het′ is a nitrogen containing 5 membered heterocyclic ring selected from imidazole, oxazole, isoxazole or triazole which ring is optionally substituted by lower alkyl, hydroxyl, halogen or amino; and Ar is phenyl optionally substituted by halogen or methyl, or a pharmaceutically acceptable acid addition salt thereof.

8. A method of inhibiting H-2 histamine receptors which comprises administering orally or parenterally to an animal, in an effective amount to inhibit said receptors, a compound of claim 1.

4,013,770

ANTIVIRAL 5-(SUBSTITUTED BENZAL) HYDANTOINS

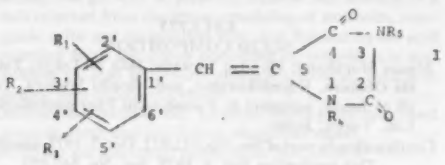
Kekhusroo R. Bharucha, Toronto; Djordje Ajdukovic, Montreal; Vytautas Pavilanis, Westmount, and Heinrich Maria Schrenk, Don Mills, all of Canada, assignors to Canada Packers Limited, Toronto and The Institute of Microbiology and Hygiene of the University of Montreal, Ville Laval, both of, Canada

Continuation-in-part of Ser. No. 262,920, June 16, 1972, abandoned. This application June 11, 1974, Ser. No. 478,310

Int. Cl.² A61K *31/415*

U.S. Cl. 424—273 16 Claims

1. A therapeutic composition in dosage unit form comprising a solid or sterile liquid pharmaceutical carrier and from about 1 to 500 milligrams of a compound of the formula:



wherein:

Formula I includes individual geometrical isomers and mixtures thereof,

R_1 is hydrogen or alkoxy of 1 to 4 carbon atoms and R_2 and R_3 are each alkoxy of 1 to 4 carbon atoms;

and R_4 and R_5 are each hydrogen or an alkanoyl group containing from 1 to 20 carbon atoms with the proviso that one of R_4 and R_5 is an alkanoyl group.

4,013,771

SUBSTITUTED 2-AMINOTHIOCHROMONES

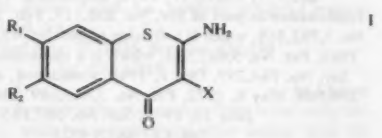
Richard E. Brown, East Hanover, and David M. Lustgarten, Dover, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 15, 1975, Ser. No. 640,667

Int. Cl.² C07D *335/06*

U.S. Cl. 424—275 8 Claims

1. A compound of the Formula I:



wherein R_1 and R_2 each represent hydrogen, lower alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms or halogen; and X represents cyano carboxamido.

4,013,772

FUNGICIDAL METHODS EMPLOYING SUBSTITUTED OXIRANE COMPOUNDS

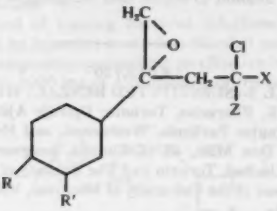
Thomas M. Ozretich, Vancouver, Wash., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 294,339, Oct. 2, 1972, Pat. No. 3,930,835, which is a continuation-in-part of Ser. No. 61,848, Aug. 6, 1970, abandoned. This application Mar. 5, 1975, Ser. No. 555,465

Int. Cl.² A01N *9/28*

U.S. Cl. 424—278 **2 Claims**

1. A method of controlling fungal organisms comprising applying to said fungal organisms and/or their habitats a fungicidal amount of a compound of the formula:



wherein X represents halogen; Z represents hydrogen, halogen, cyano or lower alkyl of 1 to 4 carbon atoms; R and R′ each independently represent hydrogen, halogen, cyano, nitro, alkoxy of 1 to 4 carbon atoms, trifluoromethyl, benzyloxy or lower alkyl of 1 to 4 carbon atoms, with the proviso that when R′ is hydrogen, R is other than hydrogen.

4,013,773

SOLID COMPOSITION

Masuo Murakami; Hiroitsu Kawada, both of Tokyo; Tadayoshi Ohmura, Higashikurume, and Hiroshi Sugiura, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 312,972, Dec. 7, 1972, abandoned This application Feb. 4, 1975, Ser. No. 547,022

Claims priority, application Japan, Dec. 9, 1971, 46-99676

Int. Cl.² A61K *31/355, 31/22*

U.S. Cl. 424—284 **2 Claims**

1. A single phase solid composition consisting of one part of Vitamin E acetate and 0.5–6 parts of calcium lactate hydrate.

4,013,774

INSECTICIDAL N-THIO-SUBSTITUTED CARBAMATES OF DIHYDROBENZOFURANOLS

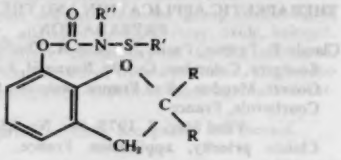
Melancthon S. Brown, deceased, late of Berkeley, Calif. (by Gustave K. Kohn, special administrator), and Gustave K. Kohn, Berkeley, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 490,178, July 29, 1974, Pat. No. 3,897,463, which is a division of Ser. No. 317,317, Dec. 21, 1972, Pat. No. 3,847,951, which is a continuation-in-part of Ser. Nos. 235,796, March 17, 1972, abandoned, and Ser. No. 235,797, March 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,117, Feb. 28, 1972, Pat. No. 3,792,169, which is a division of Ser. No. 855,421, Sept. 4, 1969, Pat. No. 3,663,594, which is a continuation-in-part of Ser. No. 764,299, Oct. 1, 1968, abandoned, and Ser. No. 250,908, May 8, 1972, Pat. No. 3,843,689. This application June 13, 1975, Ser. No. 587,195

Int. Cl.² A01N *9/28*

U.S. Cl. 424—285 **30 Claims**

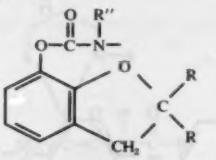
1. A method for killing insects which comprises contacting said insects or their hosts with an insecticidally effective amount of a compound of the formula



wherein

R and R″ individually are hydrogen or alkyl of 1 to 4 carbon atoms;

R′ is alkyl of 1 to 12 carbon atoms; alkenyl of 2 to 12 carbon atoms; monocyclic or bicyclic aryl of 6 to 10 carbon atoms; alkyl of 2 to 12 carbon atoms substituted with 1 to 5 fluorine, chlorine or bromine atoms; alkenyl of 2 to 12 carbon atoms substituted with 1 to 5 fluorine, chlorine or bromine atoms; monocyclic or bicyclic aryl of 6 to 10 carbon atoms substituted with 1 to 5 fluorine, chlorine or bromine atoms, or 1 to 2 nitro groups; or



wherein R and R″ individually are hydrogen or alkyl of 1 to 4 carbon atoms.

4,013,775

PROCESS FOR PREPARING A SUGAR TABLET

Arthur L. Nelson, West Chester, Pa.; Donald J. Skrabacz, Cicero, and Burbank Young, Lockport, both of Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Continuation-in-part of Ser. No. 254,552, May 18, 1972, abandoned, which is a continuation-in-part of Ser. No. 141,030, May 6, 1971, abandoned, which is a continuation-in-part of Ser. No. 767,520, Oct. 14, 1968, abandoned. This application July 3, 1974, Ser. No. 485,480

Int. Cl.² A61J *3/10;* **A23G** *3/00*

U.S. Cl. 426—285 **3 Claims**

1. A process for preparing a sugar tablet which comprises:

a. uniformly admixing to a wet, centrifuged cake sugar of crystalline dextrose having from about 12 to about 15% by weight moisture therein, said moisture including about 9% by weight water of hydration and about 2 to about 4% by weight of a low D.E. starch hydrolysate having a D.E. in the range from about 10 to about 13 and a descriptive ratio of at least about 2, wherein the descriptive ratio is the sum of the percentages of saccharides with a degree of polymerization of 1 to 6 divided by the D.E.,

b. drying and continuing to mix the admixture of centrifuged cake sugar of crystalline dextrose and starch by hydrolysate,

c. recovering a substantially non-hygroscopic agglomerated cyrstalline dextrose and starch hydrolysate which passes through a screen having at least a Tyler No. 10 mesh, said recovered agglomerated crystalline dextrose exhibiting bulk density and compressability characteristics capable of forming strong tablets which are resistant to breaking and dusting, and

d. compressing said agglomerated crystalline dextrose and starch hydrolysate into a tablet.

4,013,776

PHENYLSULPHINYL-AMIDINE DERIVATIVES

Victor Lafon, Paris, France, assignor to Societe Anonyme dite: Laboratoire L. Lafon, Maisons-Alfort, France

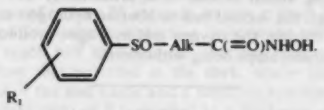
Filed Sept. 29, 1975, Ser. No. 617,665

Claims priority, application United Kingdom, Sept. 30, 1974, 42387/74

Int. Cl.² C07C *119/00, 103/30, 83/08;* A61K *31/185*

U.S. Cl. 424—315 7 Claims

1. A phenylsulphinyl derivative of the formula:



in which R_1 is at least one substituent selected from the group consisting of H, F, Cl, Br, CF_3, C_1-C_4 alkyl, C_1-C_4 alkoxy and NO_2 and Alk represents a C_2-C_4 hydrocarbon radical having a linear or branched chain.

4,013,777

BIS-PHENOXYPROPANOLAMINES

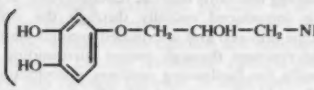
Donald F. Colella, Cornwells Heights, Pa., and Carl Kaiser, Haddon Heights, N.J., assignors to SmithKline Corporation, Philadelphia, Pa.

Filed Aug. 22, 1975, Ser. No. 606,916

Int. Cl.² A01N *9/20;* C07C *91/16*

U.S. Cl. 424—316 5 Claims

1. A chemical compound of the formula:



or a pharmaceutically acceptable acid addition salt of said compound, wherein *n* is from 2 to 8.

4. A pharmaceutical composition in dosage unit form having β-adrenergic stimulant activity comprising a pharmaceutical carrier and an effective amount of the chemical compound as defined in claim 1.

5. The method of producing β-adrenergic stimulant activity which comprises administering internally to animals requiring bronchodilation an amount sufficient to produce said activity a chemical compound as defined in claim 1.

4,013,778

METHOD FOR REDUCING BLOOD PRESSURE

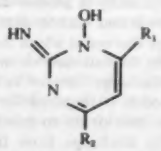
Glenn C. Morrison, Dover, and Wlaczeslaw A. Cetenko, Parsippany, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 494,793, Aug. 5, 1974, Pat. No. 3,973,016. This application Sept. 29, 1975, Ser. No. 617,546

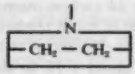
Int. Cl.² C07D *239/70*

U.S. Cl. 424—251 4 Claims

1. A hydroxypyrimidine of the formula:



wherein R_1 is CH_3 or $-NH_2$; and wherein R_2 is



4,013,779

PROCESS FOR REMOVAL OF AMMONIA, HYDROGEN SULFIDE AND HYDROGEN CYANIDE FROM GASES CONTAINING THESE SUBSTANCES

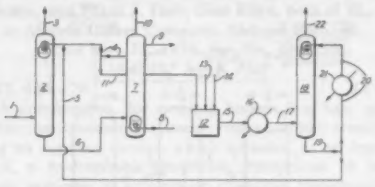
Egon Haese, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Jan. 2, 1974, Ser. No. 430,233

Claims priority, application Germany, Dec. 30, 1972, 2264264

Int. Cl.² C01B *17/04;* B01D *53/34*

U.S. Cl. 423—573 R 11 Claims



1. A process for removing gaseous ammonia, hydrogen sulfide and hydrogen cyanide forming part of gas from coke plants and the like, said process including the steps of:

washing said gas with an aqueous metallic salt solution of a salt selected from the group consisting of iron salts, manganic salts and magnesium salts and formed by an acid selected from the group consisting of sulfuric acid and sulfureous acid to absorb gaseous ammonia, hydrogen sulfide and hydrogen cyanide;

oxidizing the metallic salt solution bearing the absorbed gases to form and precipitate elemental sulfur;

recovering the elemental sulfur from the solution;

returning a first portion of the resulting oxidized solution to the gas washing step;

heating the remaining portion of the resulting oxidized metallic salt solution to a temperature of at least 900° C to produce products of combustion including nitrogen, water vapor, the acid anhydride of said acid and metallic oxide of the metal of said salt;

cooling said acid anhydride of said acid in the presence of said metallic oxide of the metal of said salt together with sufficient quantities of water to produce said aqueous metallic salt solution; and

using the produced aqueous metallic salt solution together with said first portion of said oxidized metallic salt solution to wash further quantities of said gaseous ammonia, hydrogen sulfide and hydrogen cyanide from the gas.

4,013,780

RECOVERY OF IODINE FROM BRINE WITH LINEAR ALKYL BENZENE SOLVENTS

Kishan K. Seth, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 17, 1975, Ser. No. 632,199

Int. Cl.² C01B *7/14*

U.S. Cl. 423—501 14 Claims

1. A process for extracting free iodine from brine comprising contacting said brine containing free iodine with an organic solvent substantially inert to said iodine and substantially insoluble in said brine, said solvent being a substituted aromatic hydrocarbon which is a linear alkyl benzene compound or mixture of linear alkyl benzene compounds having

from about 6 to about 14 carbon atoms in the alkyl chains which is normally liquid at room temperature and having an extraction distribution coefficient of at least 10, at a solvent to brine ratio of from about 1:10 to about 1:100 parts per part by weight and recovering said free iodine from said solvent.

4,013,781

PROCESS FOR OBTAINING HYDROGEN AND OXYGEN FROM WATER USING IRON AND CHLORINE

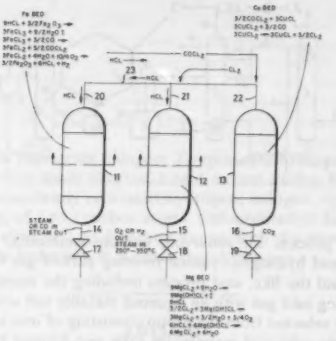
Rudolf Schulten, Richterich, Germany, assignor to Rheinische Braunkohlenwerke AG, Cologne, Germany

Filed July 12, 1974, Ser. No. 488,189

Claims priority, application Germany, July 14, 1973, 2336017

Int. Cl.² C01B *13/00*

U.S. Cl. 423—579 **5 Claims**



1. A process for obtaining hydrogen and oxygen from water in a multi-step circulatory process using iron compounds and chlorine as adjuvants, in which the circulatory process is carried out in a system of three beds which respectively contain inorganic compounds of magnesium, iron and copper, wherein the process comprises the following steps:

a. passing steam at a temperature of approximately 250°–350° C. through a first bed containing magnesium chloride, and passing the hydrogen chloride produced thereby through a second bed containing ferric oxide to convert the ferric oxide to ferric chloride;

b. passing carbon monoxide through the ferric chloride converting this to ferrous chloride, and passing the resultant chlorine carried as phosgene in the carbon monoxide stream through a third bed containing cuprous chloride, converting the cuprous chloride to cupric chloride;

c. passing an inert gas heated to approximately 600°–800° C. through the cupric chloride, converting the cupric chloride to cuprous chloride and producing chlorine which is passed through the magnesium bed to liberate oxygen and reform magnesium chloride; and

d. passing steam heated to approximately 600°–800° C. through the second bed with the addition of a small amount of oxygen to convert the ferrous chloride into ferric oxide and liberate hydrogen and hydrogen chloride, the oxygen and hydrogen produced in the conversion steps being withdrawn.

5. A process for obtaining hydrogen and oxygen from water in a multi-step circulatory process using iron compounds and chlorine as adjuvants, in which the circulatory process is carried out in a system of three beds which respectively contain inorganic compounds of magnesium, iron and copper, wherein the process comprises the following steps:

a. passing steam at a temperature of approximately 250°–350° C. through a first bed containing magnesium chloride, and passing the hydrogen chloride produced thereby through a second bed containing ferrous-ferric oxide to convert the ferrous-ferric oxide to ferrous-ferric chloride;

b. passing carbon monoxide through the ferrous-ferric chloride, and passing the resultant chlorine carried as phosgene in the carbon monoxide stream through a third bed containing cuprous chloride, converting the cuprous chloride to cupric chloride;

c. passing an inert gas heated to approximately 600°–800° C. through the cupric chloride, converting the cupric chloride to cuprous chloride and producing chlorine which is passed through the magnesium bed to liberate oxygen and reform magnesium chloride; and

d. passing steam heated to approximately 600°–800° C. through the second bed to liberate hydrogen and hydrogen chloride, the oxygen and hydrogen produced in the conversion steps being withdrawn.

4,013,782

PROCESS FOR THE OXIDATION OF A METAL HALIDE IN THE VAPOR PHASE

Stanley Powell, Stockton-on-Tees, and Glyn Thomas, Middlesbrough, both of England, assignors to Tioxide Group Limited, Billingham, England

Filed Feb. 13, 1974, Ser. No. 441,941

Claims priority, application United Kingdom, Mar. 22, 1973, 13752/73

Int. Cl.² C01B *13/14*

U.S. Cl. 423—613 **10 Claims**

1. A process for the oxidation of a metal halide in the vapour phase to produce particles of the corresponding metal oxide, said process comprising forming the lateral walls of a reaction zone from crimped annular plates separated by uncrimped annular plates, the plane of said annular plates being essentially perpendicular to the longitudinal axis of the reaction zone, introducing reactants into the reaction zone, at least one of which is introduced radially through the orifices formed between the crimped and uncrimped annular plates by first passing said reactant through means surrounding said reaction zone walls for facilitating uniform introduction of reactants through said orifices, maintaining the temperature in the reaction zone sufficiently high for the reactants to react, passing the particulate metal oxide reaction products from the reaction zone into a reaction-completion zone and thereafter into a quenching zone wherein sufficient cooling gas is introduced to reduce the temperature of the resulting mixture to below about 600° C.

4,013,783

PANCHROMATICALLY SENSITIVE ZINC OXIDE

Jan A. de Putter, Lomm, and Johannes Kortenoeven, Helden-Panningen, both of Netherlands, assignors to Oce-van der Grinten N.V., Venlo, Netherlands

Filed Apr. 30, 1975, Ser. No. 573,140

Claims priority, application Netherlands, May 3, 1974, 7405944

Int. Cl.² C01G *9/02*; G03G *5/08*

U.S. Cl. 423—622 **8 Claims**

1. In a process for producing a panchromatically sensitive zinc oxide, wherein finely divided zinc oxide is reacted with ammonia gas and carbon dioxide gas and the reaction product is heated to constant weight at a temperature between 190° and 350° C, the improvement which comprises keeping the zinc oxide particles mutually in motion during the reacting of them with the ammonia and carbon dioxide and terminating said reacting at a stage thereof at which the zinc oxide product will have a sensitivity to moisture so low that it exhibits a half-potential dark discharge time of at least 25 seconds, in that at least 25 seconds is required for a photoconductive layer made with the zinc oxide to reach half its maximum charging potential by discharge from that potential in the dark, where said layer is composed of the zinc oxide and a moisture-insensitive binder in the weight ratio of 7:1, applied

to a thickness of approximately 15 microns on a conductive support, and upon being charged to the maximum potential the photoconductive layer is kept in the dark, in air having a temperature of 40° C. and a dew point of 28° C., until its potential has dropped to half the maximum potential.

7. A panchromatically sensitive zinc oxide consisting essentially of a thermally stabilized, panchromatically sensitive reaction product of finely divided zinc oxide and ammonia and carbon dioxide gases, said product containing nitrogen in its crystal lattice and have been heated to constant weight at a temperature between 190° and 350° C. and having a sensitivity to moisture so low that it exhibits a half-potential dark discharge time of at least 25 seconds, in that at least 25 seconds is required for a photoconductive layer made with the zinc oxide to reach half its maximum charging potential by discharge from that potential in the dark, where said layer is composed of the zinc oxide and a moisture-insensitive binder in the weight ratio of 7:1, applied to a thickness of approximately 15 microns on a conductive support, and upon being charged to the maximum potential the photoconductive layer is kept in the dark, in air having a temperature of 40° C. and a dew point of 28° C., until its potential has dropped to half the maximum potential.

4,013,784

DELAYED RELEASE PHARMACEUTICAL PREPARATIONS

Peter Speiser, Clausiusstr. 25, 8006 Zurich, Switzerland

Filed Oct. 2, 1974, Ser. No. 511,174

Claims priority, application Germany, Dec. 6, 1973, 2360796

Int. Cl.² A61K 9/22

U.S. Cl. 424—19 **10 Claims**

1. A delayed release pharmaceutical preparation in granular form comprising intermixed particles of at least one orally administrable therapeutically active agent and a substantially non-toxic water-soluble calcium salt selected from the group consisting of calcium levulinate, calcium gluconate, calcium citrate and calcium chloride, at least part of said particles of said agent and said salt being enveloped by solidifying a melt of at least one triglyceride of a fatty acid of 12 to 18 carbon atoms, said salt being present in an amount to provide at least 1½ moles of calcium ion for each mole of said triglyceride and forming a substantially insoluble calcium soap with the fatty acid produced upon hydrolysis of said triglyceride in the intestinal tract, the granules of said preparation being of a grain size between about 0.1 mm. and about 1.0 mm. and containing between about 1 and 50% of said agent.

4,013,785

APAP TABLET CONTAINING FUMED SILICA AND PROCESS FOR MANUFACTURING SAME

Leonard Weintraub, Millburn, and Allan H. Rosenberg, Randolph, both of N.J., assignors to Bristol-Myers Company, New York, N.Y.

Filed Mar. 21, 1975, Ser. No. 560,913

Int. Cl.² A61K 47/00

U.S. Cl. 424—23 **13 Claims**

1. A process for preparing a tablet containing n-acetyl-p-aminophenol in therapeutically effective quantities which comprises:

a. forming a solution of n-acetyl-p-aminophenol in an organic solvent containing from about 1 to 30% by weight of n-acetyl-p-aminophenol based on the total weight of said solution;

b. distributing in said solution from about 5.2% to 25% by weight based on the weight of n-acetyl-p-aminophenol of powdered fumed silicon dioxide to form a dispersion or suspension of said powdered fumed silicon dioxide is said solution;

c. drying said dispersion or suspension to form a dried mix comprising n-acetyl-p-aminophenol and fumed silicon dioxide; and

d. pressing a quantity of tabletting mix containing said dried particulate mix comprising a unit dosage amount of n-acetyl-p-aminophenol and fumed silicon dioxide to form a tablet;

said organic solvent being selected so that said n-acetyl-p-aminophenol is soluble therein and said fumed silicon dioxide is substantially insoluble therein; the relative amounts of said n-acetyl-p-aminophenol and said fumed silicon dioxide employed being such that said dried mix contains from about 5 to 20% by weight of said fumed silicon dioxide based on the combined weight of n-acetyl-p-aminophenol and fumed silicon dioxide.

4,013,786

HAIR CREME RINSES AND HAIR CONDITIONERS CONTAINING HYDROPHOBIC-LIPOPHOBIC PERFLUORINATED COMPOUNDS

John A. Cella, Plandome Mills, N.Y.; August Emil Fiebig, Jr., Chicago, and Franz J. Pum, Glen Ellyn, both of Ill., assignors to Alberto Culver Company, Melrose Park, Ill.

Filed May 31, 1974, Ser. No. 474,953

Int. Cl.² A61K 7/08

U.S. Cl. 424—70 **12 Claims**

1. A composition, for treating human live hair, selected from the class consisting of creme rinses and hair conditioners having an aqueous carrier, which includes, as an ingredient thereof, a hydrophobic-lipophobic compound of anionic, cationic, nonionic or amphoteric character corresponding to the formula

$$CF_3—(CF_2)_x—(CH_2)_y—Z$$

where *Z* comprises a member selected from the class consisting of a water-solubilizing group and an oil-solubilizing group, *x* is an integer from 2 to 17, and *y* is an integer from 0 to 4, said compound being present in proportions, based on the weight of the composition, in the range of about 0.05% to not in substantial excess of the solubility or ready dispersibility of said compound in the composition and not in excess of 10%.

4,013,787

PIPERAZINE BASED POLYMER AND HAIR TREATING COMPOSITION CONTAINING THE SAME

Guy Varlerberghe, Montjay-la-Tour par Claye-Souilly, and Henri Sebag, Paris, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Continuation-in-part of Ser. No. 310,088, Nov. 28, 1972, Pat. No. 3,917,817. This application July 29, 1975, Ser. No. 600,188

Claims priority, application Luxembourg, Nov. 29, 1971, 64371; France, Aug. 2, 1974, 74.27030

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² A61K 7/06

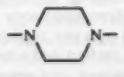
U.S. Cl. 424—70 **20 Claims**

1. A cosmetic composition for conditioning the hair comprising a solution in a solvent selected from the group consisting of water and water-lower alkanol, of a member selected from the group consisting of

1. a film-forming cationic polymer having a molecular weight of about 1,000 to 15,000 and having the formula

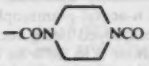
$$—A—Z—A—Z—A—Z—$$

wherein A represents



and Z represents B and B′ wherein B and B′ each indepen-

dently represent a bivalent radical selected from the group consisting of (i) hydroxypropylene, (ii) alkylene having up to 5 carbon atoms inclusive and interrupted by 1 – 2 members selected from the group consisting of —CONH,



and —CONH—R_1—NHCO— wherein R_1 represents alkylene having up to 6 carbon atoms, (III) hydroxy alkylene wherein the alkylene moiety has up to 6 carbon atoms inclusive and interrupted by a member selected from the group consisting of alkylamine wherein the alkyl moiety has 8–18 carbon atoms, benzylamine, oleylamine and oxygen, and (iv) hydroxy propylpiperazinyl-hydroxy propyl,

2. the quaternary ammonium salt of the cationic polymer in (1) and
3. the oxidation product of the cationic polymer in (1), said member being present in an amount of about 0.1 to 5 percent by weight of said composition.

4,013,788

WATERSOLUBLE EXTRACTS OF CORYNEBACTERIA, PROCESS FOR OBTAINING THEM AND THEIR USE

Pierre Jolles, Paris, and Daniele Migliore-Samour, Kremlin-Bicetre, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Apr. 30, 1975, Ser. No. 573,200
Claims priority, application France, May 6, 1974, 74.15570
Int. Cl.² A61K *39/02, 39/00*
U.S. Cl. 424—92 **7 Claims**

1. An immunological adjuvant composition comprising low molecular weight hydrosoluble fragments consisting essentially of a disaccharide-tetrapeptide, a tetrasaccharide-heptapeptide and the dimer, trimer and tetramer of the latter, said adjuvant being produced by the steps of subjecting delipidated bacterial residue of Corynebacterium Parvum containing diaminopimelic acid to grinding and homogenization in aqueous medium, centrifuging to remove undissolved solids from the aqueous medium, salting out of active material from the aqueous medium, and dialyzing said fragments containing diaminopimelic acid, having a molecular weight between 1,000 ± 200 and 8,000 ± 200 and being associated with non-aminated reducing sugars.

4,013,789

MIXTURE OF ANTIBIOTICS PRODUCED BY NEW SPECIES OF MICROMONOSPORA

Walter D. Celmer; Frank C. Sciavolino, both of New London; Walter P. Cullen, East Lyme, and John B. Routien, Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 431,845, Jan. 9, 1974, Pat. No. 3,914,218. This application May 29, 1975, Ser. No. 581,808
Int. Cl.² A61K *35/74*
U.S. Cl. 424—115 **2 Claims**

1. A process for preparing an antibiotic mixture which comprises cultivating *Micromonospora lacustris* Routien sp. nov. ATCC 21975 in an aqueous nutrient medium containing an assimilable source of carbon and nitrogen until substantial antibiotic activity is obtained and separating said antibiotic mixture therefrom.

4,013,790

PHOSPHINE-DEVELOPING PESTICIDE AND PROCESS FOR PRODUCTION THEREOF

Wolfgang Kapp, Offenbach (Main), Germany, assignor to Deutsche Gesellschaft fur Schadlingbekampfung mbH, Frankfurt am Main, Germany

Filed Sept. 10, 1975, Ser. No. 611,848
Claims priority, application Germany, Sept. 11, 1974, 2443333
Int. Cl.² A01N *11/00*
U.S. Cl. 424—128 **17 Claims**

1. A phosphine-developing pesticide which comprises (1) a phosphide selected from the group consisting of magnesium phosphide and aluminum phosphide, (2) a thermally decomposable material, comprising a chemical compound which releases a gas in the temperature range between 20° and 65° C to give a vapor pressure of at least 50 Torr., in amount of about 10 to 30 percent by weight, and (3) about 2 to 14 percent by weight of ethylene oxide polymer having a molecular weight of between 4000 and 12000.

4,013,791

PEPTIDES HAVING AN ANTIHYPERTENSIVE EFFECT

Hans Wissmann, Bad Soden, Taunus; Rolf Geiger; Ernst Lindner, both of Frankfurt am Main, and Bernward Schölkens, Bad Soden, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 3, 1975, Ser. No. 637,114
Claims priority, application Germany, Dec. 5, 1974, 2457463
Int. Cl.² A61K *37/00;* **C07C** *103/52*
U.S. Cl. 424—177 **4 Claims**

1. A peptide derivative of formula I

Y—Arg—Val—Tyr—Val—Ala—Pro—Phegly—OH (I)

in which Y stands for the sarcosyl, succinamoyl or succinoyl radical.

2. A pharmaceutical composition suitable forthe diagnosis and/or treatment of hypertonia, which comprises an effective amount of a compound as claimed in claim 1, optionally in admixture or conjunction with an inert carrier and/or preserving agent.

4,013,792

PROCESS FOR THE PRODUCTION OF BASE FOR TOPICAL STEROIDS

Martin L. Eichman, Wilmington, Del., and Susan C. Belsole, Chester, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 460,254, April 11, 1974, abandoned. This application Sept. 18, 1975, Ser. No. 614,386
Int. Cl.² A61K *31/56, 31/71*
U.S. Cl. 424—181 **1 Claim**

1. A stable aqueous clear gel composition comprising about 0.02625% by weight of betamethasone 17-benzoate about 0.5% by weight of neomycin sulfate, about 35% by weight propylene glycol, about 16.67% by weight ethanol, about 1.5% by weight of hydroxypropyl methylcellulose having a viscosity of from about 80 to about 120,000 centipoises, about 1% by weight of sodium chloride and a sufficient amount of 1N hydrochloric acid to adjust the pH of the composition to about 4.0 to 5.0.

4,013,793
COMBATING PESTS WITH O-ETHYL-S-PROPYL-THIONOTHIOL OR DITHIOPHOSPHORIC ACID PHENYL OR NAPHTHYL ESTERS

Shigeo Kishino, Tokyo; Akio Kudamatsu, Kanagawa; Iwao Takase, Tokyo; Kozo Shiokawa, Kanagawa, and Shin-ichi Yamaguchi, Tokyo, all of Japan, assignors to Nihon Tokushu Noyaku Seizo Kabushiki Kaisha, Tokyo, Japan

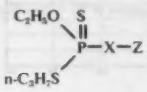
Division of Ser. No. 471,081, May 17, 1974, Pat. No. 3,898,334, which is a division of Ser. No. 123,087, March 10, 1971, Pat. No. 3,825,636. This application Apr. 25, 1975, Ser. No. 571,881

Claims priority, application Japan, Mar. 13, 1970, 45-20845

Int. Cl.² A01N *9/36*

U.S. Cl. 424—210 **9 Claims**

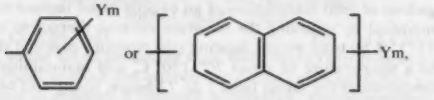
1. An insecticidal, acaricidal and nematocidal composition comprising an insecticidally, acaricidally, or nematocidally effective amount of a phosphoric acid ester of the formula



in which

X is an oxygen or sulfur atom,

Z is a group of the formula



Y is a halogen atom or a lower alkyl, lower alkoxy, lower alkylmercapto, lower alkyl-sulfinyl, nitro, cyano or phenyl group, and at least one Y is lower alkoxy, lower alkyl-mercapto, lower alkyl-sulfinyl, nitro or cyano, and

m is 1 or 2,

in admixture with a diluent.

4,013,794
O-ALKYL-S-ALKYL-O-PHENYL PHOSPHATES AND INSECTICIDAL AND ACARICIDAL METHOD OF USE

Fritz Maurer; Hans-Jochem Riebel; Lothar Rohe, all of Wuppertal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

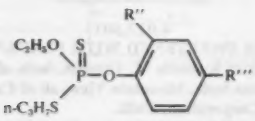
Continuation-in-part of Ser. No. 518,838, Oct. 29, 1974, abandoned. This application Jan. 13, 1976, Ser. No. 648,849

Claims priority, application Germany, Nov. 17, 1973, 2357526

Int. Cl.² A01N *9/36*; **C07F** *9/18*

U.S. Cl. 424—212 **11 Claims**

1. An O-phenylthionothiolphosphoric acid ester of the formula



in which

R'' is hydrogen or halogen, and

R''' is lower alkylsulfonyl, halogeno-lower alkylsulfonyl or 1-fluoro-1-carbo-lower alkoxymethylmercapto.

10. A method of combating insects or acarids which comprises applying to the insects or acarids, or to a habitat thereof, an insecticidally or acaricidally effective amount of a compound according to claim 1.

4,013,795
COMBATING PESTS WITH DICHLOROVINYLTHIONOPHOSPHORIC ACID ESTER AMIDES

Wilhelm Sirrenberg, Sprockhovel im westphalia; Bernhard Homeyer, Opladen; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 267,759, June 30, 1972, abandoned. This application Sept. 30, 1974, Ser. No. 510,836

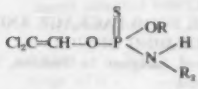
Claims priority, application Germany, July 3, 1971, 2133200

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² A01N *9/36*

U.S. Cl. 424—219 **8 Claims**

1. A method of combating a pest slected from the group consisting of of insects, acarids and nematodes which comprises applying to such pest or its habitat an insecticidally, acaricidally or nematocidally effective amount of a dichlorovinylthionophosphoric acid ester amide of the formula



in which

R is methyl, isopropyl, isobutyl or sec.-butyl, and

R_2 is methyl, ethyl, propyl or allyl.

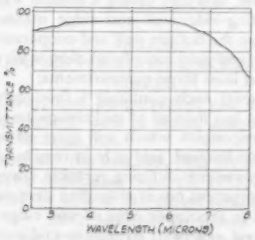
4,013,796
HOT-PRESSED IONIC FLUORIDE OPTICAL BODIES FREE OF ABSORPTION BANDS AND METHOD OF MAKING THEM

Carl F. Swinehart, University Heights, and Herbert Packer, Cleveland Heights, both of Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Filed Aug. 27, 1973, Ser. No. 391,890

Int. Cl.² C01D *3/02*; **C01F** *11/22*, *17/00*, *5/28*

U.S. Cl. 423—490 **7 Claims**



1. An optical body consisting essentially of a hot-pressed polycrystalline mass of pressable fluoride represented by the general formula: M_mF_n wherein M represents one or two elements selected from the group consisting of an alkali metal, and an alkaline earth metal, *m* is an integer representing the number of atoms of said one or two elements, and *n* is an integer which satisfies the valence requirements of M_m, said body characterized by a transmittance in excess of about 90%, without correction for reflection losses, in a portion of a predetermined usable wavelength range from about 1 micron to about 7 microns, and, less than 1% per millimeter absorption

due to absorption bands in the transmission spectra within said range wherein said absorption is due to at least one impurity selected from the group consisting of carbon dioxide, water, hydroxyl ion and acid fluorides.

4,013,797

BACTERIAL COMPOSITIONS AND PROCESS FOR FERMENTATION OF MEAT THEREWITH

Alfred J. Gryczka, Sarasota, Fla., assignor to Microlife Technics, Inc., Sarasota, Fla.

Filed Dec. 10, 1975, Ser. No. 639,473
Int. Cl.² A23L 1/31
U.S. Cl. 426—56 **19 Claims**

1. The bacterial concentrate which comprises:

a. *Micrococcus sp.* NRRL-B-8048; and

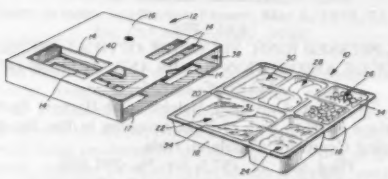
b. between about 0.01 and 100 parts by bacterial count of a lactic acid producing bacterium which ferments in meat per part of the *Micrococcus* wherein the concentrate contains at least about 1×10^9 bacteria cells per ml and sufficient nutrient medium for the bacterial cells to enhance growth during the fermentation and is frozen in the presence of a bacterial freezing stabilizing agent to less than about −20° C.

4,013,798

SELECTIVELY VENTABLE FOOD PACKAGE AND MICRO-WAVE SHIELDING DEVICE

Costas E. Goltsos, Weston, Mass., assignor to Teckton, Inc., Wellesley, Mass.

Continuation of Ser. No. 417,905, Nov. 21, 1973, abandoned. This application Dec. 24, 1975, Ser. No. 644,163
Int. Cl.² B65B 25/22
U.S. Cl. 426—107 **6 Claims**



1. A package comprising:

a tray formed from a material transparent to electromagnetic radiation, said tray having a bottom wall, a peripheral upstanding side wall and ridge means extending upwardly from the bottom wall and cooperative with said bottom wall and said peripheral side wall to define a plurality of at least three compartments;

said compartments each containig a food component, at least two, but less than all of said compartments containing food components which will give off water vapor when heat conditioned, said at least two, but less than all of said compartments defining ventable compartments;

a radiation transparent cover extending over said tray and being sealed to the upper edge of said ridge means and said peripheral side wall to isolate said compartments from each other;

means communicating said ventable compartments with each other to permit communication of said water vapor from one of said ventable compartments to the other of said ventable compartments; and

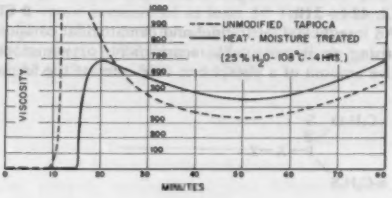
at least one portion of the seal between said cover and said peripheral wall associated with a selected one of said ventable compartments being constructed to be weaker than the other portions of said seal, said one portion of the seal being sufficiently weak as to rupture in response to build up of water vapor pressure in said ventable compartments beyond a predetermined magnitude whereby the water vapor generated in each of said ventable compartments may vent, sequentially, through said ventable compartments and through the ruptured seal in a predetermined direction.

4,013,799

PREPARATION OF A STABILIZED PRECOOKED BABY FOOD FORMULATION THICKENED WITH MODIFIED TAPIOCA STARCH

Wayne J. Smalligan; Vincent J. Kelly, and Estela G. Enad, all of Fremont, Mich., assignors to Gerber Products Company, Fremont, Mich.

Filed May 30, 1972, Ser. No. 257,563
Int. Cl.² A23L 1/10
U.S. Cl. 426—578 **11 Claims**



1. A process for preparing a thickened, wet, ready-to-eat baby food from an aqueous formulation having a pH of up to 4.5, consisting essentially of the steps of: incorporating into said aqueous formulation from about 5 to 55 pounds per 100 gallons of final formulation of an ungelatinized tapioca starch modified by adjusting the moisture content thereof to about 15–35% by total weight, heating said moisture adjusted starch to a temperature of about 70°–130° C, and maintaining said temperature for about from 1 to 72 hours; filling and sealing containers with said aqueous formulation; and heating said starch-containing aqueous formulation for a period of time sufficient to commercially sterilize the formulation.

4,013,800

4-HYDROXY-5-METHYL-2,3-DIHYDROFURAN-3-ONE AND METHODS OF MAKING AND USING THE SAME

Hideo Shimazaki, Tokyo; Shuji Tsukamoto; Tadaomi Saito, both of Yokohama; Sadanari Eguchi, Sendai, and Yasushi Komata, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Division of Ser. No. 881,951, Dec. 29, 1969, Pat. No. 3,647,825, which is a continuation-in-part of Ser. No. 712,397, March 12, 1968, abandoned. This application July 16, 1971, Ser. No. 163,434
Claims priority, application Japan, Mar. 15, 1967, 42-16265; Apr. 15, 1967, 42-23921
Int. Cl.² A23L 1/22, 1/231
U.S. Cl. 426—536 **13 Claims**

1. A method of imparting a maltol-like flavor and aroma to an ingestible composition which comprises mixing said composition with 10 to 500 parts per million (by weight) of 4-hydroxy-5methyl-2,3-dihydrofuran-3-one, based on the weight of said ingestible composition.

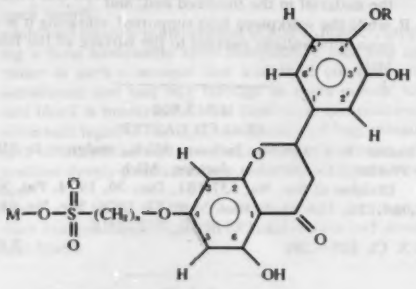
4,013,801

EDIBLES SWEETENED WITH FLAVANONES

Daniel J. Dawson; Kenneth M. Otteson, both of Menlo Park, and C. Thomas Seitz, Mountain View, all of Calif., assignors to Dynapol Corporation, Calif.

Filed Feb. 13, 1976, Ser. No. 657,906
Int. Cl.² A23L 1/236
U.S. Cl. 426—548 **19 Claims**

1. A sweetened edible composition comprising an edible material having admixed therewith a sweetening amount in the range of from about 0.002% to about 1% by weight basis material of flavanone represented by the structural formula



wherein R is a lower alkyl of from one to three carbon atoms inclusive, *n* is an integer of from one to three inclusive and M is hydrogen or a physiologically acceptable metal cation.

4,013,802

CORN FLAKE PROCESS AND PRODUCT

Stanley H. Reesman, Battle Creek, Mich., assignor to General Foods Corporation, White Plains, N.Y.

Filed May 21, 1975, Ser. No. 579,355
Int. Cl.² A23L *1/164*
U.S. Cl. 426—621 **12 Claims**

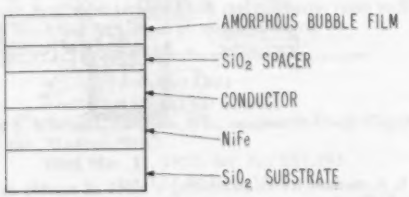
1. In the art of producing corn flakes from corn grits which have been cooked and wherein the cooked grits are flaked and toasted to produce a blistered appearance, the improvement which comprises subjecting said cooked grits to a humid gaseous atmosphere having a tenperature of about 120° F–300° F for a period of time effective to produce a grit temperature of at least 120° F and to plasticize the grits preparatory to flaking.

4,013,803

FABRICATION OF AMORPHOUS BUBBLE FILM DEVICES

Richard M. Josephs, Willow Grove, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,417
Int. Cl.² B05D *5/12*; C23C *11/00*
U.S. Cl. 427—8 **5 Claims**



1. The method of fabricating an amorphous bubble film memory device of the type having a plurality of layers comprising essentially a substrate layer, a bubble film layer, an insulating layer, a magnetic film layer and a conductor layer wherein the improvement consists of:

a. forming said amorphous bubble film as the topmost layer of said plurality of layers.

4,013,804

METHOD AND COMPOSITION FOR TREATING WOOD AND COATED WOODEN ARTICLES OBTAINED THEREBY

Stanley A. Gruetzman, Shoreview, Minn., assignor to Andersen Corporation, Bayport, Minn.

Continuation-in-part of Ser. Nos. 507,371, Sept. 19, 1974, abandoned, and Ser. No. 575,365, May 7, 1975, Pat. No. 3,996,410. This application Mar. 5, 1976, Ser. No. 664,166
Int. Cl.² B05D *3/06*
U.S. Cl. 427—33 **10 Claims**

1. A process for the preservation and electrostatic coating of a wooden substrate with a coating which is adhered to the substrate; said process comprising the steps of:

a. placing the wooden substrate in substantially continuous motion with a conveying means;

b. directing the resulting substantially continuous motion of said wooden substrate through a treatment zone for treatment of said wooden substrate with a liquid means comprising a liquid solution for preserving the wood and improving its electrical conductivity, said liquid solution comprising:

an amount, at least equal to the threshold concentration, as determined by test NWMA-M-1-70, of a plasticized biocidal wood preservative with toxicity toward Lenzites Trabea Pers. ex. Fr., Madison 617, A.T.C.C., said wood preservative comprising at least one biocidal agent selected from the group consisting of a copper salt, a mercury salt, an organometallic compound, and a phenolic compound; said amount being within the range of 0.1–10% by weight;

an amount of a paraffin wax sufficient to provide said wooden substrate with at least 60% water repellency, as determined by NWMA test M-2, said paraffin wax having a drop melt point, by ASTM D-127, below 145° F., said amount being less than 2% by weight of said solution, and about 80 to about 99% by weight of a substantially non-aqueous, organic solvent system comprising at least 10% by weight of a polar organic liquid with a solubility in water greater than 5 wt. % and a boiling point at normal ambient conditions of less than 120° C.;

c. directing the said substantially continuous motion of the treated wooden substrate, emerging from said treatment zone, through an evaporation zone to an electrostatic spraying zone; and

d. electrostatically spraying the treated wooden substrate with a coating composition in said electrostatic spraying zone.

4,013,805

ACID-MODIFIED POLY(VINYL ACETATE) TEXTILE SIZES

Albert E. Corey, East Longmeadow, and Donald D. Donermeyer, Springfield, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 406,508, Oct. 15, 1973, Pat. No. 3,919,449. This application Sept. 19, 1975, Ser. No. 614,827
The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.
Int. Cl.² B05D *3/02*; D03D *25/00*
U.S. Cl. 427—390 R **8 Claims**

1. A method for sizing textiles which comprises applying to the textile material an aqueous solution of the interpolymerization product of from 90.5 to 95.5 weight percent of vinyl acetate, from 4.0 to 7.5 weight percent of acrylic acid and from 0.5 to 2.0 weight percent of a monoalkyl ester of maleic, fumaric, or citraconic acids in which the alkyl group contains from 1 to 8 carbon atoms; wherein the solvent portion of the solution is an aqueous solution of a base selected from the group consisting of hydroxide carbonates and bicarbonates of alkali metals, ammonia, methylamine, dimethylamine, trimethylamine, ethylamine, diethylamine, triethylamine and morpholine.

4,013,806
MANUFACTURE OF THIN LAYERS OF POLYURETHANE ELASTOMERS

Otto Volkert, Ludwigshafen; August Wigger, Frankenthal; Manfred Zuerger, Mannheim, and Peter Richter, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Dec. 4, 1973, Ser. No. 421,608

Claims priority, application Germany, Dec. 4, 1972, 2259360

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² B05D *3/06*

U.S. Cl. 427—54 **17 Claims**

1. In a process for the formation on a substrate of thin polyurethane elastomeric layers of from about 0.2 to 5 mm thickness having a Shore hardness A of not more than 70° by curing a liquid polyurethane-elastomer-forming reaction mixture which consists essentially of

A. at least one polymeric material containing at least two hydroxyl groups in the molecule which are capable of reacting with isocyanates, said polymeric material being selected from the group consisting of polyesters, polyethers, polyester urethanes and polyether urethanes; and

B. diisocyanates or prepolymers drived from at least one of the hydroxyl-containing compounds mentioned under (A) above and diisocyanates, which prepolymers contain at least two isocyanate groups in the molecule,

which curing is effected by heating said mixture, the improvement which comprises: incorporating into said reaction mixture a minor amount of substantially compatible monomers having at least two photocrosslinkable double bonded carbon atoms prior to applying said mixture to the substrate; pouring said mixture onto said substrate to form a layer thereon; irradiating said layer to effect photocrosslinking of the monomers and gelling of the layer; and thereafter heating the layer to form a polyurethane elastomer.

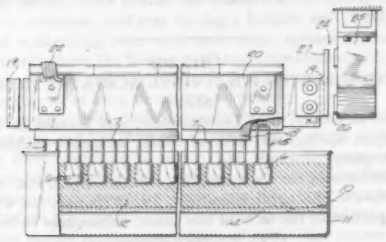
4,013,807
COATING ELECTRONIC COMPONENTS BY MEANS OF FLUIDIZED BED

Gordon A. Putney, New Berlin, and William D. McCoy, Brookfield, both of Wis., assignors to Systemation Div. of Koerper Engineering Associates, Inc, Milwaukee, Wis.

Filed Mar. 26, 1975, Ser. No. 562,186

Int. Cl.² B05D *1/24*

U.S. Cl. 427—184 **3 Claims**



1. A method by which a workpiece that comprises a body and electrical leads that project to one side of the body can have applied to it a substantially uniform thickness coating of heat plasticizable material, which coating covers all portions of the body but covers substantially only so much of each lead as to provide a seal around it at its junction with the body, and wherein the coating is applied by heating the workpiece and supporting it by its leads, body lowermost, in a fluidized bed that comprises heat plasticizable material in finely divided solid form suspended in a vessel by gas blown upwardly through the material from the bottom of the vessel, which method is characterized by:

A. so supporting the body in the fluidized bed that the top of the body is substantially at the level of the surface of the material in the fluidized bed; and

B. while the workpiece is so supported, vibrating it in directions substantially parallel to the surface of the fluidized bed.

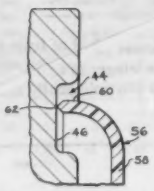
4,013,808
SEALED CASTER

Thomas A. Crawford, Jackson, Mich., assignor to Midwest Precision Corporation, Jackson, Mich.

Division of Ser. No. 537,101, Dec. 30, 1974, Pat. No. 3,964,124. This application Mar. 12, 1976, Ser. No. 666,205

Int. Cl.² B05D *3/12, 1/18*

U.S. Cl. 427—289 **7 Claims**



1. The method of sealing a caster having a forked body including an upper bearing body, wheel supporting legs and a wheel mounted upon said legs for rotation about an axis, comprising the steps of mounting a mandrel upon the body legs having a configuration defining a wheel engageable skirt, coating the caster body and mandrel with a liquid resilient coating material adhering the material thereto, curing the coating material to form a resilient sealing covering, severing the coating material upon said mandrel at a location wherein the severed edges will sealingly engage a wheel rotatably mounted upon the caster legs, removing the mandrel and severed coating material from the caster body, and rotatably mounting a wheel upon the caster legs such that said severed edges sealingly engage the wheel.

4,013,809
METHOD OF SEALING A POROUS BLOCK

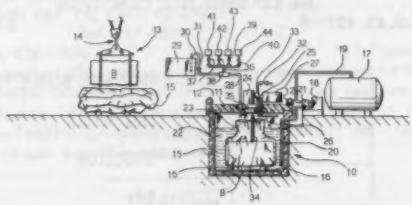
Giuseppe Marocco, Turin, Italy, assignor to Soberman Establishment, Liechtenstein, Liechtenstein

Filed Dec. 23, 1975, Ser. No. 643,738

Claims priority, application Italy, Dec. 31, 1974, 70807/74

Int. Cl.² B05D *3/00*

U.S. Cl. 427—296 **4 Claims**



1. A method for consolidating a block of marble or other natural stone, having cavities open to the outside, comprising the following sequential steps:

a. placing a block to be consolidated in a bag made of liquid-tight flexible sheet material, said bag having an open mouth;

b. enclosing said bag and said block placed therein in a pressure-tight container, with said bag having its mouth above said block and open upwardly;

c. evacuating said container into a vacuum state;

d. while said vacuum is maintained in said container, supplying a liquid into said container and around said bag until said liquid reaches a level lower than the level of said open mouth;

e. while said vacuum is maintained in said container, supplying a fluid hardenable resin composition into said container in such a manner that said fluid composition is introduced into said bag through its open mouth, until said block is immersed in said fluid resin composition;

f. while said liquid is maintained around said bag, releasing said vacuum from said container, so that said resin composition deeply penetrates into said cavities in said block; and

g. while said liquid is still around said bag, allowing said resin composition to harden in said cavities and around said block.

4,013,810

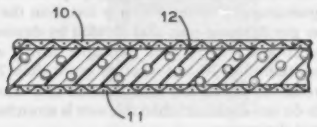
SANDWICH PANEL CONSTRUCTION

William Gordon Long, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,912

Int. Cl.² B32B *5/18, 5/16, 5/22*

U.S. Cl. 428—308 **5 Claims**



1. A sandwich panel consisting essentially of a foam core of thermoplastic resin, non-fibrous shapes mixed with said thermoplastic resin and formed from material remaining in the solid state at a higher temperature than the plasticizing temperature of said thermoplastic resin wherein said non-fibrous shapes are not more than 35% by weight of said foam core, and face sheets formed from thermoplastic resin reinforced with graphite fibers for, said face sheets being bonded to said foam core, said thermoplastic resin in said face sheets being the same type as said foam core resin.

4. A method for manufacturing a sandwich panel consisting essentially of the steps of mixing a thermoplastic resin with a solvent to dissolve said thermoplastic resin, mixing hollow glass spheres with said dissolved thermoplastic resin, casting said mixture of glass spheres and dissolved thermoplastic resin into a desired shape, drying said cast mixture to drive off said solvent to form a foam core for the sandwich panel wherein said spheres are not more than 35% by weight of said foam core preparing a mixture of said thermoplastic resin with graphite fibers, compression molding said resin and fibers to produce a void-free face sheet, placing said face sheet on said foam core, and remolding under conditions of heat and pressure said face sheet to cause said thermoplastic resin to flow and to bond said face sheet to said foam core.

4,013,811

LAMINATED ANODE

Gerald F. Maruska, Madison, Wis., assignor to Oscar Mayer & Co. Inc., Madison, Wis.

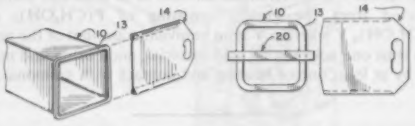
Filed Mar. 11, 1975, Ser. No. 557,293

Int. Cl.² B65D *5/56*

U.S. Cl. 428—35 **8 Claims**

1. In the processing of a meat material in a metal mold of stainless steel, laminated means for substantially preventing the attack of the metal mold by the salts in the meat material, said means comprising (a) a layer of sacrificial metal less noble than the mold metal, said metal layer to be positioned at the end of the mold and held in generally full surface contact with the meat material and in electrical contact with the mold metal and (b) a layer of impermeable material between the metal mold and the layer of sacrificial metal in the area where the meat material is in contact with the layer of sacrificial metal for preventing contact of the sacrificial metal and mold in said area, said impermeable material having a character such as to prevent staining of the mold during sacrificing of the metal layer.

3. A laminated anode for use in a metal mold of stainless steel during processing of a meat material in the mold to protect the mold surfaces in contact with the meat material against corrosive action, said anode being adapted to be



placed and held between the mold and a cover therefor and being in strip form and flexible and including a layer of sacrificial metal less noble than the metal of the mold selected from the group consisting of aluminum, magnesium or zinc and a layer of impermeable material approved for use with food, wherein said sacrificial metal is in electrical contact with the mold and the meat material and said impermeable material being such as to protect the cover from sacrificial metal deposits and said strip being disposable after the processing of the meat material.

4,013,812

LAMINATED FABRIC

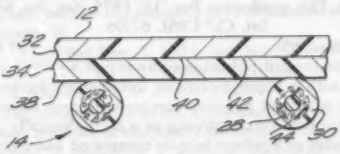
David H. Geiger, Kirby Lane, Rye, N.Y. 10580

Continuation-in-part of Ser. No. 381,065, July 20, 1973, Pat. No. 3,899,622. This application Aug. 5, 1975, Ser. No. 602,114

The portion of the term of this patent subsequent to Aug. 12, 1992, has been disclaimed.

Int. Cl.² B32B *7/04, 31/06*

U.S. Cl. 428—245 **16 Claims**



1. A composite sheet material comprising a foraminous web formed of a plurality of fibers defining a plurality of openings in the web and a thin film of heat sealable plastic sheet material having a pair of opposite sides, said fibers being coated with a heat sealable plastic material, and said plastic sheet being secured on one side thereof to said plastic coating on said fibers and extending across said openings, thereby to form said composite sheet.

4,013,813

AMINOALKYLPHOSPHONIC ACID ESTER-BASED TEXTILE FIRE RETARDANTS

Robert Bruce LeBlanc, Wickford, and James Henry Badger, Narragansett, both of R.I., assignors to LeBlanc Research Corporation, East Greenwich, R.I.

Filed Feb. 27, 1975, Ser. No. 553,872
Int. Cl.² C09K 3/28; C09D 5/18
U.S. Cl. 428—272 4 Claims

1. The process for rendering fire retardant to textile material comprising a cellulosic fiber blended with polyester, comprising impregnating and material with a water-soluble condensation product and dimethyl aminomethylphophonate and up to about 6 times its molar amount of at least one member selected from the group consisting of $P(CH_2OH)_3$ and $P(CH_2OH)_4$ Y wherein Y is an equivalent amount of the anion of a least one acid, drying said material, and curing said material by at least one of heating and contact with ammonia.

4,013,814

POLY(HALOETHYL-ETHYLENEOXY) PHOSPHORIC ACID ESTER POLYMERS

Edward D. Weil, Hastings-on-Hudson, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 535,004, Dec. 20, 1974, which is a division of Ser. No. 409,486, Oct. 25, 1973, Pat. No. 3,896,187, which is a continuation-in-part of Ser. No. 164,928, July 21, 1971, abandoned, which is a continuation of Ser. No. 760,988, Sept. 19, 1968, abandoned. This application Jan. 23, 1976, Ser. No. 651,861
Int. Cl.² C07L 9/08
U.S. Cl. 428—277 8 Claims

1. A method for increasing the flame resistance of a member selected from the group consisting of fabrics, paper and adhesives comprising applying thereto a liquid poly(chloroethylethyleneoxy) phosphoric acid ester prepared by reacting tris(2-chloroethyl) phosphate by heating said phosphate to a temperature within the range of from about 140° to about 220° C. in the presence of a basic catalyst with ethylene dichloride as reaction by-product; and terminating said reaction by-product level with ethylene dichloride in an amount of from about 0.5 mole to about 0.9 mole ethylene dichloride per mole of tris(2-chloroethyl) phosphate in said reaction in an effective amount sufficient to increase the flame resistance of said member.

4,013,815

FIRE RETARDANT UNSATURATED POLYESTERS

Edwin Dorfman; Willis T. Schwartz, Jr., both of Grand Island, and Raymond R. Hindersinn, Lewiston, all of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 383,749, July 30, 1973, abandoned. This application Dec. 18, 1975, Ser. No. 642,026
Int. Cl.² C08L 67/06
U.S. Cl. 428—285 37 Claims

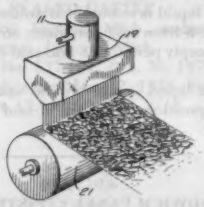
1. An unsaturated polyester composition which is copolymerizable with a copolymerizable unsaturated monomer to form a fire retardant polymer composition, said unsaturated polyester composition comprising an α,β-ethylenically unsaturated polyester of a polycarboxylic compound and a polyhydric alcohol, which contains halogen in a proportion of greater than about 4.4 weight percent, and about 0.55 to about 50 weight percent of iron compound that is insoluble in said polyester when admixed with a copolymerizable unsaturated monomer, or an iron compound that is soluble in said polyester and monomer but which is free of iron-to-carbon bonds, wherein said composition is substantially phosphorus-free, wherein the proportions are based on the weight of unsaturated polyester.

4,013,816

STRETCHABLE SPUN-BONDED POLYOLEFIN WEB

Reinhardt N. Sabee, and C. Craig Sabee, both of Appleton, Wis., assignors to Draper Products, Inc., Appleton, Wis.

Filed Nov. 20, 1975, Ser. No. 633,991
Int. Cl.² D04H 3/14
U.S. Cl. 428—288 4 Claims



4. A spun-bonded polypropylene web having at least 50% tensile web elongation at break, the filaments of said web being extruded at a velocity in excess of 15 meters per second onto a chilled surface having a temperature less than 65° and having a size of 20 denier per filament dpf or less, a basis weight in grams/square meter which is less than the sum of 7 times denier per filament plus 200 divided by denier per filament minus 20 and plus 50, said filaments having a birefringence of less than 0.0120 and wherein more than 70% of all filament crossover points are fuse bonded and wherein said fused bonds do not separate when the web is stretched to 50% of its original dimension.

4,013,817

METHOD FOR ADHERING A RUBBER COMPOSITION TO A METAL MATERIAL

Kinji Masuda, Higashi-Murayama; Hideaki Saigo, Yokohama; Kazuo Naito, Kodaira; Tadashi Utsunomiya, Higashi-Murayama, and Sakae Inoue, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed July 2, 1975, Ser. No. 592,702
Claims priority, application Japan, July 4, 1974, 49-75884
Int. Cl.² B05D 7/14, 3/00; B32B 15/06, 15/08
U.S. Cl. 428—462 17 Claims

1. A method for adhering a butadiene-acrylonitrile copolymer rubber (NBR) composition to a metal material, which comprises compounding

A. at least one of halogenated aromatic hydrocarbons having the following general formula

$$R_{n'}-(Ar)-(CX_mH_{3-m})_n \quad (1)$$

or

$$(Ar)_{n''}-\underset{\displaystyle X}{\overset{\displaystyle |}{C}}-R_{3-n''} \quad (2)$$

wherein Ar is benzene nucleus residue or naphthalene nucleus residue and when there are two or more Ar groups, they may be same or different, R is a hydrocarbon residue having 1–6 carbon atoms, hydrogen atom or halogen atom, and when there are two or more R groups, they may be same or different, X is halogen atom and when there are two or more X groups, they may be same or different, when there are two or more CX_mH_{3-m} groups, they may be same or different, m is 1–3, n'' is 1–3, and when Ar is benzene nucleus residue, n is 1–6 and n' is 0–5 (provided that $n+n'$ 6) and when Ar is naphthalene nucleus residue, n is 1–8 and n' is 0–7 (provided that $n+n'$ 8), and

B. at least one compound selected from oxides, carbonates, sulfides and hydroxides of metals of groups I, II, IV, V and VIII in the Periodic Table, and aluminum hydroxide, to the NBR composition, the amount of said component (A) being 0.2–20 parts by weight based on 100 parts by weight of total polymer, and the amount of said component (B) being 0.5–10 parts by weight based on 1 part by weight of said component, (A), contacting the resulting rubber composition with the metal material, and vulcanizing the rubber composition to adhere the composition to the metal material.

4,013,818

HIGH TEMPERATURE SECONDARY BATTERIES

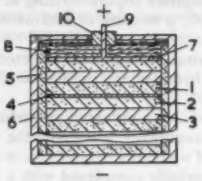
Barry Anthony Askew, Broadstone, and Ronald Holland, Wareham, both of England, assignors to National Research Development Corporation, London, England

Filed Sept. 25, 1975, Ser. No. 616,821

Claims priority, application United Kingdom, Sept. 28, 1974, 42248/74

Int. Cl.² H01M *43/00*

U.S. Cl. 429—112 **12 Claims**



1. A high temperature lithium-sulphur secondary battery comprising a stack of cells, each cell including a pellet of immobilized electrolyte sandwiched between a negative electrode pellet composed at least partially of lithium and a positive electrode pellet composed at least partially of a metal sulphide, and an intercell metal sheet adapted to prevent direct chemical action between the electrode pellets of adjacent cells while maintaining electrical contact between them, the pellets being contained within a close-fitting tube of material which is both (1) electrically insulating at the battery operating temperature and (2) chemically inert with respect to the electrodes, the electrolyte and the battery reaction.

4,013,819

HANDLE CONSTRUCTION FOR BATTERIES

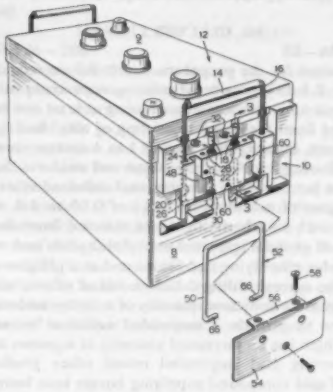
Nicholas G. Grabb, Scarborough, Canada, assignor to Varta Batteries Limited, Willowdale, Canada

Filed Aug. 27, 1975, Ser. No. 608,141

Int. Cl.² H01M *2/10*

U.S. Cl. 429—187 **12 Claims**

1. A battery handle rope and rope holder combination comprising a length of rope having at each end thereof a rigid elongate lug, and a rope holder body portion integrally molded with a side of a battery case, said rope holder body portion comprising two separate laterally spaced apart sets of first and second passageways, each passageway having a top and a bottom opening, said first and second passageways being spaced apart with the bottom opening of each passageway being unobstructed, each passageway being adapted to receive and permit passage therethrough of said length of rope and said lugs, the area beneath the bottom opening of each passageway being sufficiently unobstructed to permit removal of said rigid elongate lug from the bottom opening of said first passageway and permit insertion of the same lug into the bottom of said second passageway when an end of said battery handle rope is threaded through a set of said first and second passageways, means for securing said rigid elongate lugs in the upper portion of said second passageway, the location of the bottom opening of said first passageway relative to the bottom opening of said second passageway being such that a turning moment is exerted on the longitudinal axis of said rigid elongate lug by said battery handle rope being under tension as said lug is about to be withdrawn from the bottom of said second passageway, said second passageway having a cross-sectional area at the lower portion thereof which is adapted to cause such lug to frictionally bind therein when such a turning



moment is exerted on said lug, and when said means for securing said elongate lug in second passageway is accidentally released and said battery handle rope is under tension, said elongate rigid lug frictionally binds in the lower portion of said second passageway as a turning moment is exerted on said lug as it is about to be withdrawn from the bottom of said second passageway by the tension in said rope so that said battery handle rope is retained in said rope holder.

4,013,820

UNIVERSALLY USEABLE TABLETING INGREDIENTS

Bahram Farhadieh, Libertyville, and James Maynard Berdahl, Gurnee, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 7, 1974, Ser. No. 521,989

Int. Cl.² C08B *5/00*, *13/00*

U.S. Cl. 536—64 **5 Claims**

1. The process of making a powdered, controlled-release tableting medium of essentially unlimited shelf-life consisting essentially in dissolving a nontoxic polymeric film-forming material having repeating free carboxylic acid groups attached to the polymeric chain in a low boiling, substantially water-free organic liquid and combining this solution with a solution of ammonia, sodium hydroxide or potassium hydroxide in an alcohol of 1 – 3 carbon atoms under conditions of turbulence over a period of at least 15 minutes and separating the formed polymer salt from the liquid phase by a method which does not require exposing said polymer salt to an extended period of heat.

4,013,821

PROCESS FOR PREPARATION OF MIXED CELLULOSE ETHERS CONTAINING 2,3-DIHYDROXYPROPYL ETHER GROUPS

Konrad Engelskirchen, Lank, Niederrhein, and Joachim Galinke, Dusseldorf-Holthausen, both of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf, Germany

Filed Mar. 17, 1975, Ser. No. 558,631

Claims priority, application Germany, Mar. 29, 1974, 2415154

Int. Cl.² C08B *11/193*

U.S. Cl. 536—88 13 Claims

1. A process for the preparation of cellulose mixed ethers containing 2,3-dihyroxypropyl ether groups comprising suspending a starting cellulose ether having at least one substituent selected from the group consisting of alkyl having 1 to 4 carbon atoms, hydroxyalkyl having 1 to 4 carbon atoms, carboxyalkyl having 2 to 4 carbon atoms and mixtures thereof in an aqueous inert organic solution, said cellulose ether having a total degree of substitution (D.S.) of 0.05 to 4.0, reacting said ether with an etherifying agent selected from the group consisting of glycidol, glycerol monohalohydrin and mixtures thereof under etherifying conditions and at a pH above 7.5 to produce the corresponding cellulose mixed ethers, adding to said suspension a sufficient quantity of a compound supplying borate ions to provide a suspended cellulose mixed ether product which has an increased viscosity in aqueous solution, and recovering said suspended mixed ether product; the amount of said compound supplying borate ions being in the range of 0.01 to 0.5 part by 1 part by weight of said ethers.

4,013,822

CHROMIUM-CONTAINING CATALYST SYSTEMS AND THEIR USE FOR THE POLYMERIZATION OF OLEFINS

Hans Feichtinger, Dinslaken; Hans-Walter Birnkraut, Oberhausen; Siegfried Lutze, Gelsenkirchen; Wolfgang Payer, Oberhausen, and Dieter Schnier, Wesel-Blumenkamp, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Filed July 9, 1975, Ser. No. 594,481

Claims priority, application Germany, July 15, 1974, 2433904

Int. Cl.² C08F *4/22, 4/62, 10/00*

U.S. Cl. 526—129 23 Claims

1. An olefin polymerization catalyst comprising a chromium compound deposited on a carrier material, which chromium compound is complexed with a straight-chain, branched-chain, or cyclic aliphatic hydrocarbon or mixture thereof such that the mol ratio of aliphatic hydrocarbon to chromium compound is 1:2–3, said chromium compound being deposited on said carrier material in an amount between 10^{-3} and 10 millimols chromium compound per gram of carrier material, said carrier material also containing a trialkyl, tricycloalkyl, triaryl, monohalodihydrocarbyl or monoalkyldihydrocarbyl aluminum compound.

4,013,823

PROCESS FOR PREPARING ELASTOMERIC COPOLYMERS OF ETHYLENE AND HIGHER ALPHA-OLEFINS

Paolo Longi; Nazzareno Cameli; Sandro Parodi, and Remo Cervi, all of Milan, Italy, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 368,358, June 8, 1973, abandoned. This application Feb. 7, 1975, Ser. No. 547,928

Claims priority, application Italy, June 9, 1972, 25464/72

Int. Cl.² C08F *210/00, 212/00, 110/02*

U.S. Cl. 526—166 4 Claims

1. A process for preparing saturated, elastomeric and vulcanizable copolymers of ethylene with alpha-olefins having the general formula $CH_2 = CHR$ in which R is an alkyl radical containing from 1 to 6 carbon atoms, or low-unsaturated copolymers of ethylene, said alpha-olefins $CH_2 = CHR$ and polyenes, which process comprises copolymerizing, at a temperature of from −50° C to +150° C, a mixture of said monomers in contact with a catalyst prepared by mixing:

a. a catalyst-forming component selected from the group consisting of the hydrides and organometallic compounds of aluminum with

b. a catalyst-forming component consisting of the product obtained by cogrinding a halogenated Ti compound with a support comprising, as the essential support constituent, an anhydrous magnesium or manganese dihalide, and with a Lewis base, under conditions such that, in the absence of the base, the support attains a surface area higher than 5 m^2/g, the total molar ratio between the magnesium or manganese dihalide and the Lewis base in the catalyst being between 2:1 and 5:1, and the amount of Ti in catalyst-forming component (b) being between 0.1% and 30% by weight.

2. A process for preparing saturated, elastomeric and vulcanizable copolymers of ethylene with alpha-olefins having the general formula $CH_2 = CHR$ in which R is an alkyl radical containing from 1 to 6 carbon atoms, or low unsaturated copolymers of ethylene, said alpha-olefins, and polyenes, which process comprises copolymerizing at a temperature of −50° C to +150° C, a mixture of said monomers in contact with a catalyst obtained by mixing:

a. a catalyst-forming component selected from the group consisting of hydrides and organometallic compounds of aluminum with

b. a catalyst-forming component consisting of the product obtained by cogrinding a support the essential support constituent of which is a magnesium or manganese dihalide at least partially complexed with a Lewis base and a halogenated titanium compound, under conditions such that magnesium or manganese dihalide not complexed with the Lewis base attains a surface area higher than 5 m^2/g, the total molar ratio between the magnesium or manganese dihalide and the Lewis base in the catalyst being between 2:1 and 5:1, and the amount of Ti in the catalyst-forming component (b) being between 0.1% and 30% by weight.

4,013,824

MIXING OF ORGANOSULFUR MOLECULAR WEIGHT MODIFIER WITH EMULSIFIER IN PRESENCE OF MONOMER OR DILUENT

Carl A. Uraneck, and John E. Burleigh, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 360,960, May 16, 1973, abandoned. This application Nov. 18, 1974, Ser. No. 524,828

The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.

Int. Cl.² C08F *1/09, 1/36, 3/02*

U.S. Cl. 526—205 12 Claims

10. In a process of aqueous emulsion polymerization wherein at least one polymerizable monomer is polymerized in the presence of components comprising a free-radical initiator, aqueous emulsifier solution, organosulfur compound as molecular weight modifier, in aqueous medium, the steps which comprise.

admixing components consisting essentially of said aqueous emulsifier solution, said organosulfur compound, and an additive which is a polymerization-inert hydrocarbon diluent,

coagitating the admixture of aqueous emulsifier, organosulfur compound and additive, prior to admixture with said

initiator, to form a coagitated mixture, wherein the degree of coagitation employed is sufficient to markedly increase the reactivity of said organosulfur compound as said molecular weight modifier,

wherein the amount of said additive employed is an effective amount sufficient to substantially avoid depletion of said organosulfur compound molecular weight modifier during said aqueous emulsion polymerization and is in the range of about 0.1 to 50 phm,

and thereafter admixing said coagitated admixture with said polymerizable monomer, said initiator, and aqueous medium, and polymerizing said polymerizable monomer under aqueous emulsion polymerization conditions;

wherein said polymerizable monomer is a polymerizable conjugated diene, monovinyl-substituted aromatic compound, monopropenyl-substituted aromatic compound, polymerizable vinylnitrile ester of acrylic or methacrylic acid, vinyl ester, or vinyl halide; and said inert hydrocarbon diluent is an aliphatic, cycloaliphatic, or aromatic hydrocarbon, said organosulfur compound is a mercaptan, dialkyldixanthogen, diaryl disulfide, tetraalkylthiuram mono or disulfide, mercaptothiazole, or mixture, and said emulsifier in said emulsifier solution is a rosin acid soap, disproportionated rosin soap, fatty acid soap, alkarylsulfonated, nonionic emulsifier, or mixture.

4,013,825

MANUFACTURE OF INSOLUBLE AND ONLY SLIGHTLY WATER-SWELLABLE POLYMERS OF N-VINYL LACTAMS OF IMPROVED ADSORPTIVITY

Walter Denzinger, Speyer; Ernst Hofmann, and Karl Herrle, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 3, 1975, Ser. No. 592,811

Claims priority, application Germany, Aug. 5, 1974, 2437640

Int. Cl.² C08F *26/06, 26/10*

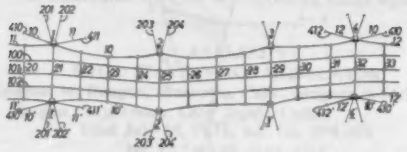
U.S. Cl. 526—208 **3 Claims**

1. A process for the manufacture of insoluble and only slightly swellable homopolymers of a vinyl lactam or copolymers of two or more vinyl lactams, said vinyl lactam being selected from the group consisting of N-vinyl pyrrolidone, N-vinyl-caprolactam and N-vinyl piperidone in dilute aqueous solution, in which the vinyl lactam or a mixture of the vinyl lactams is polymerized at a pH of at least 6 and at most 10 and with the exclusion of oxygen, wherein the polymerization or copolymerization is initiated by 0.5 to 10% by weight of said monomers of divinyl ethylene urea, and wherein from 0.05 to 2% by weight, based on vinyl lactam of at least one α- or β-ketocarboxylic acid selected from the group consisting of ascorbic acid, ethyl aceto-acetate and pyruvic acid and mixtures thereof is present in the reaction mixture.

4,013,826
HIGH-VOLTAGE OVERHEAD TRANSMISSION LINE WITH UNIQUELY STRESSED ELEMENTS

Karl-Heinz Herzig, Viernheim, Germany, assignor to BBC Brown, Boveri & Cie, Mannheim, Germany

Filed July 9, 1975, Ser. No. 594,353
Claims priority, application Germany, July 9, 1974, 2432849
Int. Cl.² H02G 7/00, 7/22
U.S. Cl. 174—43 4 Claims



1. High-voltage overhead transmission line with masts, insulator chains and conductor cables attached to high-strength guy lines and with ground wires comprising:

a plurality of guyed masts with thrust footings forming support positions each with at least two support points in a plane normal to the conductor cables,

each guy line passing over at least two support points and being anchored to the ground at its ends,

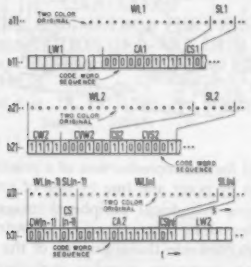
the guyed masts of each support position and the guy lines in a rigging field being tied together in an approximately horizontal plane by catenary-arranged insulators,

the conductor cables being suspended from the network thus formed.

4,013,827
PROCESS AND AN ARRANGEMENT FOR FACSIMILE CODING WITH ADDRESS INSERTION OF A SPECIFIC SURFACE ELEMENT SCANNED FOR TRANSMISSION LIMITING FAULT EFFECTIVENESS UP TO THE NEXT INSERTED ADDRESS

Alexander Starck, Munich, and Wolfgang Postl, Hochenrain, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 22, 1975, Ser. No. 624,660
Claims priority, application Germany, Dec. 9, 1974, 2458119
Int. Cl.² H04N 7/12
U.S. Cl. 358—263 9 Claims



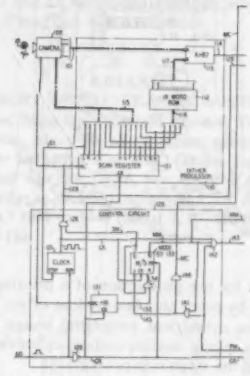
1. In a process for facsimile coding in which the items of information contained on a two-color original consisting of individual surface elements are scanned for the purpose of transmission, in which sequence lengths are represented in lines by code words composed of binary characters, and in which a line synchronizing word is produced at the beginning of the coding of each line, the improvement therein comprising the step of:

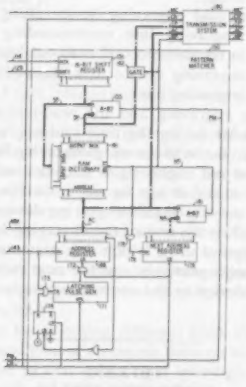
inserting address words which indicate an address of a specific surface element of the sequence after the line synchronizing word after a given number of transmitted binary characters.

4,013,828
METHOD AND ARRANGEMENT FOR REDUCING THE BANDWIDTH AND/OR TIME REQUIRED TO TRANSMIT A DITHERED IMAGE

Charles Norris Judice, Lincroft, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 20, 1976, Ser. No. 659,723
Int. Cl.² H04N 7/12
U.S. Cl. 358—133 20 Claims





1. Display apparatus comprising

means for generating a plurality of image words representing respective N-bit patterns of a dithered image,

means for generating a plurality of multibit data words each corresponding to a respective one of said image words, each data word having less than N bits, and

means responsive to each data word for displaying the pattern associated with the image word corresponding to that data word.

4,013,829

METHOD FOR THE PRODUCTION OF PRINTING FORMS

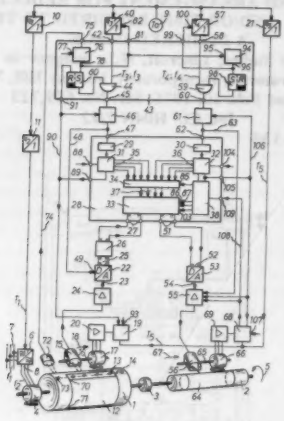
Walter Baar, and Jürgen Dölves, both of Kiel, Germany, assignors to Dr. -Ing. Rudolf Hell GmbH, Kiel, Germany

Filed Feb. 27, 1976, Ser. No. 661,984

Claims priority, application Germany, Feb. 28, 1975, 2508734

Int. Cl.² H04N 1/06

U.S. Cl. 358—299 19 Claims



1. A method for the production of a printing form by the scanning point-by-point and line-by-line of an image pattern along successive cylindrical peripheral image lines and engraving cavities along corresponding cylindrical peripheral engraving lines, the steps comprising:

generating image signals from said image pattern from along one of said cylindrical peripheral image lines;

reading said image signals into a storage device;

reading said stored signals out of said storage device and coupling said read-out image signals to an engraving device;

engraving with said engraving device along a cylindrical peripheral engraving line corresponding to said one image line in response to said read-out image signals;

moving said engraving device to a succeeding cylindrical peripheral engraving line;

inhibiting the engraving and the read-out of said image signals at least during the time said engraving device is being moved to the succeeding engraving line, continuing the read-out and engraving of said succeeding engraving line at the stored image signals or cavities marking the end of the moving of said engraving device

and in that, when the end of the engraving line is reached, the first portion of it, which was previously omitted, is engraved retrospectively and the next movement of the engraving device to the succeeding engraving line takes place.

4,013,830

VIDEO DISC STYLUS

Harry Louis Pinch, Princeton, N.J., and Herbert Irwin Moss, Yardley, Pa., assignors to RCA Corporation, New York, N.Y.

Filed May 19, 1975, Ser. No. 578,899

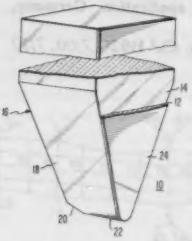
Int. Cl.² G11B 3/44

U.S. Cl. 358—128 5 Claims

1. A stylus comprising:

a support structure of dielectric material tapering to a tip at one end thereof, the tip having a curved bottom surface; and

a cermet film on a portion of the support structure's surface, the cermet film composed of a conductive material and a dielectric material which has a high adherence to the support structure, the concentration of the constituent materials in the cermet film varying through the thickness



of the film so that the film at the interface with the support structure has a high dielectric concentration while the cermet film at its exposed surface has a high conductive material concentration.

4,013,831

METHOD FOR THE PRODUCTION OF PRINTING FORMS

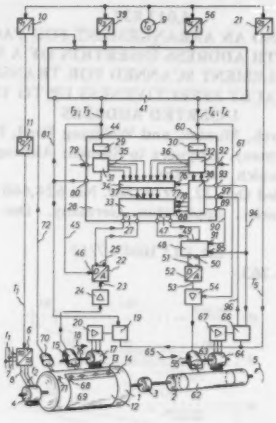
Jürgen Dölves, and Dieter Grieger, both of Kiel, Germany, assignors to Dr. -Ing. Rudolf Hell GmbH, Kiel, Germany

Filed Mar. 12, 1976, Ser. No. 666,494

Claims priority, application Germany, Mar. 11, 1975, 2510533

Int. Cl.² H04N 1/06

U.S. Cl. 358—299 8 Claims



1. A method for the reproduction of a printing form by the scanning point by point and line by line of an image pattern along successive cylindrical peripheral image lines and engraving cavities along corresponding cylindrical peripheral engraving lines, wherein the engraving of the cavities is carried out by an engraving member including an engraving needle as a cutting tool, said engraving needle effecting a stroke into the engraving position whenever a cavity is to be engraved on an engraving line, the steps comprising,

generating image signals from said image pattern from along one of said image lines, said image signals representing the lengths of strokes of said engraving needle and the depths of the cavities to be engraved;

moving down said engraving needle into the engraving position at the beginning of one engraving line with a partial stroke length being less than the stroke lengths defined by the corresponding image signal;

moving down said engraving needle into the engraving position during the engraving of several cavities of said engraving line with partial stroke lengths, which increase from cavity to cavity until said partial stroke length being substantially equal to the nominal value defined by the corresponding image signal;

engraving the residual cavities of said engraving line to depths defined by the corresponding image signals; and then,

re-engraving the incomplete cavities of said engraving line in accordance with the corresponding image signals.

4,013,832

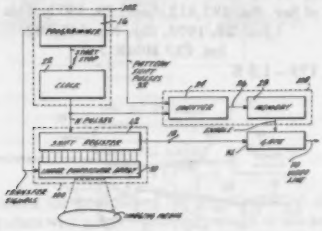
SOLID STATE IMAGE MODULATOR

Graham M. Douglas, Monrovia, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed July 28, 1975, Ser. No. 599,899

Int. Cl.² H04N *5/30, 3/14*

U.S. Cl. 358—212 **8 Claims**



1. For use with an array of N photosensors which produce output signals in response to radiant energy incident on them, apparatus for electrically producing the same effect as if the pattern of radiant energy incident on the photosensors were modulated by placing a given alterable or movable pattern of spatially-varying transmittance in the path of the radiant energy incident on the photosensors, said apparatus comprising:

signal attenuating means coupled to each photosensor for attenuating the output signals of the photosensors according to a given pattern which is referenced to the relative locations of the photosensors within the array and which is independent of the electrical and optical characteristics of the photosensors.

4,013,833

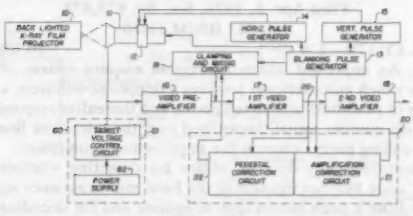
VIDEO SYSTEM AND METHOD FOR PRESENTATION AND REPRODUCTION OF X-RAY FILM IMAGES

Samuel Morton Zimmerman, 3530 Forest Lane, Suite 98, Dallas, Tex. 75235

Filed Aug. 14, 1975, Ser. No. 604,807

Int. Cl.² H04N *5/19*

U.S. Cl. 358—111 **14 Claims**



1. In a video camera including a pickup tube with electron beam generating means and a target plate, means for vertically and horizontally deflecting the electron beam, means for generating blanking and synchronizing signals for blanking said electron beam and controlling said deflecting means in synchronism therewith, amplifying means including a plurality of stages connected to the output of said target plate for amplifying the composite video signal produced thereby, and clamping circuit means for coupling said blanking signal generating means and said amplifying means, the improvement comprising:

an amplification correction circuit; means for feeding the composite video signal from the output of one video amplifier stage to said amplification correction circuit;

said amplification correction circuit including: means for removing the blanking component from said composite video signal; means for rectifying the remaining video signal component of said composite video signal to produce a varying DC reference voltage signal proportional to said video signal component, and defining an amplification correction signal; and means for feeding said amplification correction signal to the output bias voltage circuit for one of said video amplifier stages for varying the gain of said one video amplifier.

4,013,834

GHOST SIGNAL ERASING SYSTEM

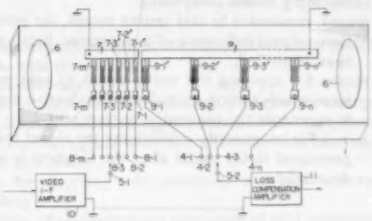
Yoshihiro Kino, Machida; Nobuaki Furuya, Tokyo, and Mitsuru Asanuma, Machida, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 17, 1975, Ser. No. 568,834

Claims priority, application Japan, Apr. 18, 1974, 49-44071

Int. Cl.² H04N *5/44;* **H03H** *7/30;* **H01V** *7/00*

U.S. Cl. 358—166 **2 Claims**



2. A variable delay element comprising

a piezoelectric medium,

a plurality of first interdigitated electrode pairs formed on said medium,

a plurality of second interdigitated tapped-electrode pairs formed on said medium spaced from said first plurality of electric pairs, a video intermediate frequency signal applied to a selected one of said first interdigitated electrode pairs causing an elastic surface wave to be generated and propagated along the surface of said piezoelectric medium, said propagated wave being extracted as a delayed video intermediate frequency signal voltage from a selected one of said second interdigitated tapped-electrode pairs, and

switch means for selecting different ones of said first and second interdigitated electrode pairs so as to change the combination of first and second interdigitated electrode pairs, thereby varying the delay time.

4,013,835

DATA ENTRY SYSTEM

Joseph J. Eachus, Cambridge; Theodore S. Graff, Sudbury, and Douglas H. Seggelin, Whitman, all of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Oct. 23, 1975, Ser. No. 625,240

Int. Cl.² G08C *21/00*

U.S. Cl. 178—18 **23 Claims**

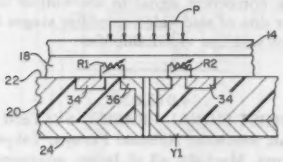
1. In a data entry system wherein data is entered by depress-

ing locations on a touch sensitive device, apparatus for identifying a depressed location comprising:

a matrix of conductors comprising a plurality of first conductors oriented in a first direction, a plurality of second conductors oriented in a second direction transverse to said first directions;

a plurality of pressure sensitive electroconductive means for conducting electrical current between respective first and second conductors, each said pressure sensitive electroconductive means being operative to conduct an electrical current when the location immediate thereto has been depressed;

means for sequentially testing each pressure sensitive electroconductive means for the existence of the current that is established between a respective first conductor and a



respective second conductor when the location immediate thereto has been depressed; and

means, responsive to said testing means, for terminating the testing of each pressure sensitve electroconductive means when a depressed location has been identified, said terminating means comprising:

means, responsive to said testing means, for generating a status signal indicative of a depressed location having been identified,

means for applying the status signal to said means for sequentially testing each electroconductive means so as to terminate the sequential testing, and

means for temporarily maintaining the signal level of the generated status signal after the location is no longer depressed.

4,013,836

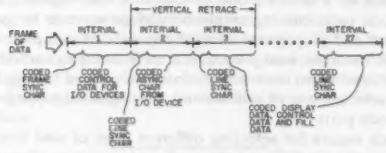
DATA TRANSMISSION AND DISPLAY SYSTEM

Robert C. Williams, Churchville, Pa., assignor to GTE Information Systems Incorporated, Morrestown, N.J.

Filed Sept. 3, 1974, Ser. No. 502,895

Int. Cl.² H04L *5/14*

U.S. Cl. 178—58 R **15 Claims**



1. A data transmission system comprising:

a data transmission line having a first end and a second end;

data source means coupled to the first end of the data transmission line for transmitting data;

data handling means coupled to the second end of the data transmission line for utilizing data transmitted by the data source means and capable of initiating data;

said data source means being operative in a plurality of intervals of time to transmit data synchronously over the data transmission line in a first direction for use by the data handling means;

first circuit means coupled to the second end of the data transmission line and to the data handling means and operative to receive and couple the data transmitted synchronously by the data source means over the data transmission line in the first direction to the data handling means; and

said data handling means being operative when data is initiated thereby to transmit said data asynchronously over the data transmission line in a second direction to the data source means, said transmission of data occurring in predetermined intervals of time intermediate predetermined ones of the plurality of intervals of time during which data is transmitted synchronously by the data source means over the data transmission line in the first direction.

4,013,837

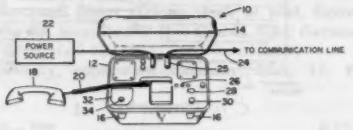
VOICE SECURITY METHOD AND SYSTEM

Kenneth M. Branscome, Dallas; William M. Feath, Irving; George E. Goode, Richardson; Kenneth W. Heizer, and Barrie O. Morgan, both of Dallas, all of Tex., assignors to Datotek, Inc., Dallas, Tex.

Division of Ser. No. 293,412, Sept. 29, 1972. This application Jan. 29, 1975, Ser. No. 545,082

Int. Cl.² H04K *1/02*

U.S. Cl. 179—1.5 S **1 Claim**



1. In a voice scrambler decoding system connectable to a communications line, the combination comprising:

registers for receiving a predetermined digital sequence via the communications line prior to reception of scrambled voice data;

means for summing voltage signals from said registers representative of the digital sequence stored in said registers;

means for generating a first signal when the summed voltage signal is above a predetermined threshold value;

means for generating a second signal when the differential of said summed voltage indicates the first occurrence of a negative-going value of said summed voltage;

means responsive to said first and second signals for generating an enable signal; and

means responsive to said enable signal for storing a prime digital word received via the communications line to synchronize said system.

4,013,838

TELEPHONIC ENQUIRY SYSTEM

Maw-Kuei Tsai, Santa Clara, Calif., assignor to Tonix Corporation, Santa Clara, Calif.

Filed Apr. 5, 1976, Ser. No. 673,878

Int. Cl.² H04M *11/10*

U.S. Cl. 179—2 A **10 Claims**

1. An improved telephone remote enquiry system of the type which automatically answers a telephone call from a dial type or push-button type telephone and thereafter responds to a code number signal transmitted over the telephone lines by the calling party, wherein the improvement comprises:

multifrequency decoder means for detecting whether the code number signal is in the form multifrequency signals from a push button type telephone and for decoding any such multifrequency signals into a binary coded decimal output representative of the code number signal,

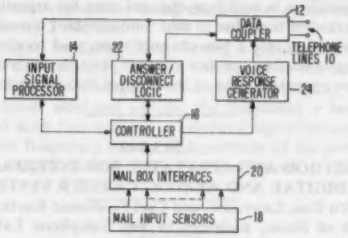
dial pulse counter means for counting dial telephone produced pulses to generate a binary coded decimal output representative of the code number signal,

mode selector means for determining whether the code number signal is in the form of dial pulses or multifrequency signals and for selecting the appropriate binary coded decimal output of either the multifrequency decoder means or the dial pulse counter means,

system control means activated by the binary coded decimal output signal from the mode selector means for providing an audible response over the telephone lines to the calling party which is specific to the code number signal, and

wherein the dial pulse counter means further includes dial pulse processing and counting means for detecting and counting dial pulse signals over noise pulses, the dial pulse processing and counting means including,

first means for detecting the first leading pulse of a train by checking whether the next subsequent pulse occurs within a predetermined time period thereafter,



second means for comparing the amplitudes of all subsequent pulses with a first fixed percentage of the amplitude of the immediately preceding pulse and qualifying as valid all such pulses whose amplitudes exceed the first fixed percentage,

third means for restarting the first means if the amplitude of the next valid pulse occurs before the expiration of the predetermined time period following the receipt of the first leading pulse, the third means repeating this procedure in iterative fashion until the first leading pulse is finally determined by the receipt of a subsequently occurring valid pulse at the end of the predetermined time period with no intervening valid pulses, and

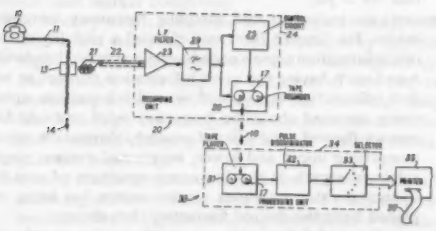
fourth means for counting pairs of valid pulses which occur with predetermined timed relationships with respect to the finally determined leading pulse and for generating an output signal representative of the count.

4,013,839

SYSTEM FOR MONITORING DIALLED TELEPHONE NUMBERS

Arthur Stewart Bell, London, England, assignor to Telstop S.A., Luxembourg, Germany

Filed Nov. 8, 1974, Ser. No. 522,129
Int. Cl.² H04M *15/06*
U.S. Cl. 179—7 R **23 Claims**



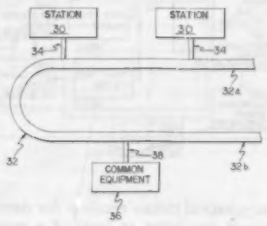
1. A system for monitoring numbers dialled over a telephone line the system comprising at least one recording means for sensing dial pulses representative of numbers dialled as well as pulses bearing no relationship to to said numbers dialled on a monitored telephone line and for recording each of the sensed pulses on a recording medium, and processing means for playing-back the recorded pulses on the recording medium, for analysing the pulses recorded thereon to determine the numbers dialled on the monitored line and for producing a display of numbers dialled.

4,013,840

TDM AND FDM TELEPHONE COMMUNICATION

Scott K. Anderson, Orem, Utah, assignor to Teleplex, Inc., Orem, Utah

Continuation-in-part of Ser. No. 492,397, July 29, 1974, abandoned, and a continuation-in-part of Ser. No. 253,265, May 15, 1972, abandoned, and a continuation-in-part of Ser. No. 601,363, Aug. 4, 1975. This application July 11, 1975, Ser. No. 595,100
Int. Cl.² H04J *1/10*
U.S. Cl. 179—15 FD **18 Claims**



1. A random access communication system for a plurality of telephone sets comprising:

a data processor;

common cabling for communicating frequency multiplexed amplitude modulated signals between said telephone sets and control signals between said telephone sets and said data processor;

means for coupling said processor and said sets to said cabling;

a plurality of said telephone sets, each of said telephone sets comprising:

a transmitter for transmitting a carrier signal over said cabling to other telephone sets, each said transmitter comprising an adjustable source of said carrier signals to transmit selected carrier signals and means to amplitude modulate the carrier signal transmitted by said transmitter,

a receiver for receiving a carrier signal over said cabling from other telephone sets, each said receiver being pre-tuned to receive only one carrier signal which differs for each telephone set and is dedicated thereto and means to amplitude demodulate the carrier signal received by said receiver, and

means for initiating a call to a called telephone set comprising means responsive to pulse code groups which are included in said control signals for digitally adjusting the frequency of the carrier signal of the transmitter associated with a calling telephone set to the dedicated carrier signal associated with the receiver of the called telephone set and adjusting the frequency of the carrier signal of the transmitter associated with the called set to the dedicated carrier signal associated with the receiver of the calling set; and

wherein said data processor responds to said means for initiating a call by transmitting pulse code groups which are included in said control signals indentifying the called and calling telephone sets to said calling and called sets respectively, and wherein said control signals are transmitted in time division multiplex format.

4,013,841

FOUR-CHANNEL STEREO RECEIVER

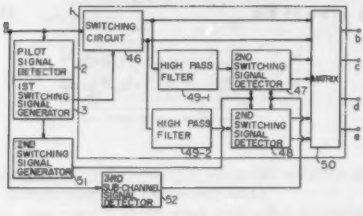
Tsuneo Ohkubo, Katano, and Yoshio Horiike, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 316,488, Dec. 19, 1972, abandoned. This application July 21, 1975, Ser. No. 597,331

Claims priority, application Japan, Dec. 23, 1971, 46-524; Dec. 27, 1971, 47-615; Feb. 1, 1972, 47-11659; Feb. 7, 1972, 47-13736; Feb. 8, 1972, 47-14260; Feb. 8, 1972, 47-14261; Feb. 8, 1972, 47-14262; Apr. 18, 1972, 47-38992; Apr. 18, 1972, 47-38993; Apr. 18, 1972, 47-38994; Apr. 18, 1972, 47-38995; Apr. 22, 1972, 47-40560; Apr. 22, 1972, 47-40561; Apr. 25, 1972, 47-41755; Apr. 25, 1972, 47-41966; July 28, 1972, 47-75673; July 29, 1972, 47-76118; July 31, 1972, 47-78511; Aug. 15, 1972, 47-82006

Int. Cl.[2] H04H 5/00

U.S. Cl. 179—15 BT 34 Claims



1. A four-channel stereo receiver for demodulating a four-channel signal consisting at least of a main channel signal component constituted by a first combination of the four signals, a first sub-channel signal component obtained through suppressed-carrier amplitude modulation of a second combination of said four signals, a second sub-channel signal obtained through suppressed-carrier amplitude modulation of a third combination of said four signals and being orthogonal to said first subchannel signal, and a third sub-channel signal obtained through suppressed-carrier amplitude modulation at a frequency twice as large as that of the first sub-carrier wave by a fourth combination of said four signals, and a pilot signal at a frequency equal to one-half that of said first sub-channel signal, comprising

demodulating means comprising a first circuit supplied with said four-channel composite signal and switched by a first switching signal, a second circuit supplied with the output of said first circuit for performing detection by a second switching signal, said first and second switching signals being produced under control of said pilot signal, and a matrix means supplied with output signals from said first and second circuits and having outputs for providing four output signals.

3. In a four-channel stereophonic receiver for receiving and demodulating a two-channel or a four-channel composite signal, said four-channel composite signal containing a main channel signal component constituted by a first one of four different combinations of signals, said combinations of signals being obtained from four signals stereophonically related to one another; a first sub-channel signal component obtained through suppressed-carrier amplitude modulation of a second one of said combinations of signals; a second sub-channel signal component obtained through suppressed-carrier amplitude modulation of a third one of said combinations of signals on a sub-carrier wave 90° out of phase with respect to said first sub-channel signal component; a third sub-channel signal component obtained through suppressed-carrier amplitude modulation of a fourth one of said combinations of signals, the frequency spectrum of said third sub-channel signal extending to a frequency higher than that of said first and second sub-channel signal; and a pilot signal at a frequency equal to one-half that of said first sub-channel signal, the improvement comprising:

detector circuit means for detecting said third subchannel signal; and

control circit means coupled to the output of said detector circuit and including a time constant circuit and a unidirectional semiconductor element between said detector circuit and said time constant circuit, said semiconductor element being supplied with a DC voltage detected by the detector circuit upon the appearance of said third sub-channel signal at said detector circuit to thereby render said semiconductor element conductive and then allow the DC voltage to immediately be applied to said time constant circuit, while upon disappearance of the third sub-channel signal the semiconductor element is rendered non-conductive but said time constant circuit holds the applied DC voltage for a predetermined period of time, said control circuit means operating in a four-channel state immediately upon the appearance of said third sub-channel signal at the detector circuit, maintaining operation in said four-channel state for a predetermined period of time due to said time-constant circuit and then switching into a two-channel state, said receiver operating in its four- or two-channel state in accordance with the operative state of the control circuit means.

4,013,842

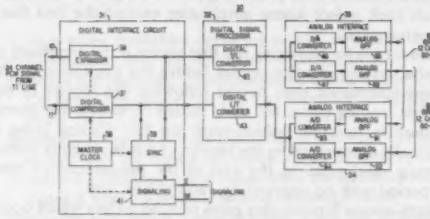
METHOD AND APPARATUS FOR INTERFACING DIGITAL AND ANALOG CARRIER SYSTEMS

Chih-Yu Kao, Lawrence, and Carl Ferdinand Kurth, Andover, both of Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 15, 1976, Ser. No. 677,400

Int. Cl.[2] H04J 1/00

U.S. Cl. 179—15 FD 12 Claims



1. Apparatus for interconnecting at least one channel in an n-channel, time-division multiplex carrier system with a corresponding channel in a p-channel, frequency-division multiplex, carrier system, $p \quad n$, said at least one channel carrying a first information signal of nominal bandwidth b and said time-division multiplex carrier system having a sampling frequency k, the apparatus comprising:

means for increasing the sampling frequency of said at least one time-division multiplex channel from k to mk, where m is an integer selected such that the frequency band occupied by said frequency-division multiplex carrier system, when loaded with p-channels, lies between the frequencies mk and $2\,mk$, that is to say, m is selected such that $mk > pb$;

means, connected to said sampling frequency increasing means, for filtering from said channel a plurality of second information signals each having a nominal bandwidth b and each having the same information content as said first information signal, said second information signals being centered about the frequency $mk/4$ and odd harmonics thereof, said filtered second information signals comprising upper and lower, suppressed-carrier, single-sideband signals in the frequency spectrum of said frequency division multiplex carrier system but being displaced from the desired frequency slots therein;

means for modulating said second information signals with the frequency $mk/4$ while simultaneously increasing the sampling frequency thereof from mk to $2\,mk$ thereby to

generate an overlapped upper and lower single-sideband signal of bandwidth *b* centered about zero frequency and replicas thereof centered about multiples of *mk*/2;

means for filtering from the output of said modulating means all signals other than the overlapped sideband signals centered about zero frequency and the image thereof centered about the frequency *mk*;

means for modulating the output of said modulating output filtering means by the sinusoidal and cosinusoidal functions of the frequency *r*;

means for summing the results of said sinusoidal and cosinusoidal modulation thereby to generate an upper sideband signal of bandwidth *b* displaced upwardly from zero frequency by the frequency *r* and a lower sideband signal displaced downwardly from the frequency 2 *mk* by the frequency *r*;

a digital-to-analogue converter for converting said upper and lower sideband signals into their analogue equivalents, said conversion being effectuated at the sampling frequency 2 *mk*; and

an analogue bandpass filter, having a passband centered about the frequency 3 *mk*/2, connected to the output of said digital-to-analogue converter for rejecting all but said lower sideband signals, the frequency *r* being selected such that said lower sideband signal occupies the desired frequency slot in the spectrum of the *p*-channel frequency division multiplex carrier system.

4,013,843

MARKER FOR EXTENDING CALLS TO REMOTE JUNCTIONS IN A TELECOMMUNICATIONS SYSTEM

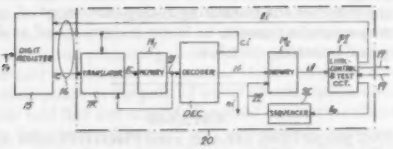
Carlo Lupattelli, and Alfredo Miotti, both of Milan, Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Oct. 29, 1975, Ser. No. 626,875

Claims priority, application Italy, Oct. 29, 1974, 28898/74

Int. Cl.² H04Q *1/30*

U.S. Cl. 179—18 EB **8 Claims**



1. In a telecommunication system including a multiplicity of lines adapted to initiate outgoing calls to destinations identified by multidigit call numbers, said destinations being reachable through remote junctions served by a multiplicity of transmission paths and identified by a characteristic initial portion of a call number, a register engageable by a calling line to store at least said characteristic portion, switch means for temporarily connecting one of said transmission paths to a calling line, and a marker responsive to digits stored in said register for controlling said switch means, the improvement wherein said marker comprises:

first memory means connected to said register and provided with a first multiplicity of cells addressable by respective digits and digit combinations stored in said register upon the initiation of an outgoing call, each of said first cells containing a code word falling into one of several categories including a first category for complete identifications and a second category for incomplete identifications of selected junctions;

decoding means connected to said first memory means for receiving said code words therefrom and translating same into a variety of signals including identification signals on a first output in the case of code words in said first category and a request signal on a second output in the case of code words falling into said second category, said second output being connected to said register for calling forth a further digit in response to said request signal;

a control circuit for said switch means; and

second memory means connected to said first output and provided with a second multiplicity of cells addressable by said identification signals to read out operating instructions for said control circuit.

4,013,844

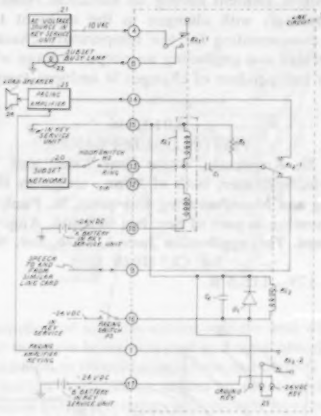
LINE CIRCUIT FOR A UNIVERSAL KEY/INTERNAL TELEPHONE SYSTEM

Bruce Ronald Saxon, Harrisburg, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Feb. 6, 1976, Ser. No. 655,805

Int. Cl.² H04M *1/72*

U.S. Cl. 179—99 **7 Claims**



1. A line circuit for a universal key/internal telephone system comprising:

first means coupled to a tip and a ring conductor of a telephone subset external of said line circuit to light a subset busy lamp external of said line circuit when said subset is "off-hook" and to provide a balanced telephone circuit for voice signals in a normal conversation mode with another telephone subset external of said line circuit coupled to a line circuit identical to said line circuit and in a paging mode when said paging mode is selected; and

second means coupled to said ring conductor to select said paging mode, said second means disabling said conversation mode when said paging mode is selected;

said first and second means being coupled to power supply voltages having polarities present in a conventional key telephone system service unit external of said line circuit.

4,013,845

TEMPERATURE COMPENSATING REPRODUCING SYSTEM

Yukio Sugimoto, Katano; Makoto Okamasa, Kyoto, and Toyoshi Fukumura, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 24, 1974, Ser. No. 463,668

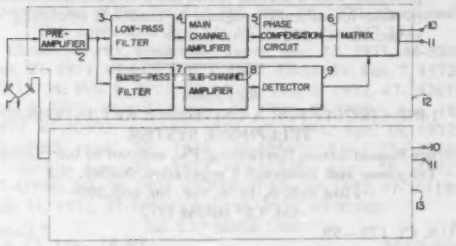
Claims priority, application Japan, Apr. 25, 1973, 48-48029; May 15, 1973, 48-54409

Int. Cl.² H04R *1/16*

U.S. Cl. 179—100.41 R **3 Claims**

1. A record reproducing system comprising a displacement detection type cartridge, said cartridge being provided with a bias current and producing an output signal having a magnitude which varies inversely with changes in ambient temperature; a reproducing circuit for converting said output signal

into audio signals; and a bias circuit interposed between said cartridge and said reproducing circuit for varying the bias current of said cartridge in a direct relationship with changes in ambient temperature, said bias circuit including a temperature sensitive element having an electrical resistance which varies inversely with changes in the ambient temperature thereby compensating for the temperature characteristic of said cartridge and producing an output voltage which is substantially independent of changes in ambient temperature.



4,013,846

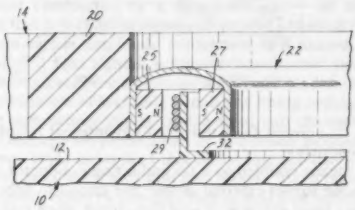
PISTON LOUDSPEAKER

William G. Krawczak, White Bear Lake, and William M. Mularie, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 608,446, Aug. 28, 1975, abandoned. This application June 1, 1976, Ser. No. 691,472

Int. Cl.² H04R *9/06*

U.S. Cl. 179—115.5 R **7 Claims**



1. A loudspeaker comprising:

a rigid, light-weight diaphragm having broad front and rear faces,

a magnetically permeable keeper having a channel-shaped cross-section and forming a substantially closed loop,

means supporting said keeper adjacent and spaced from said rear face of said diaphragm with the open side of said channel facing said diaphragm,

a pair of magnets formed of fine grain, high coercivity, permanent magnetic material and supported within said keeper channel, one along each side wall of said channel, said magnets extending around said substantially closed loop of said keeper and being magnetized and positioned with opposite poles in spaced facing relation, and

a voice coil secured to said rear face of said diaphragm and positioned in the space between said magnets around said substantially closed loop of said keeper.

4,013,847

NO-LOAD TAP CHANGER SWITCH WITH RACK AND PINION GEAR OPERATING MECHANISM

Edward F. Guidosh, Coitsville Township, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 24, 1975, Ser. No. 599,241

Int. Cl.² H01H *3/00, 19/54*

U.S. Cl. 200—18 **2 Claims**

1. Tap changer apparatus comprising:

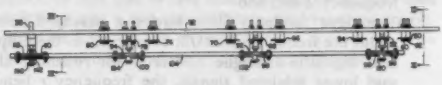
a tank,

first, second and third winding phases disposed in said tank, said winding phases each having tapped winding sections with tap leads connected thereto, said winding phases being horizontally spaced in said tank with their longitudinal axes in a common plane,

an elongated insulating member disposed in said tank with its longitudinal axis substantially parallel to said common plane,

first, second and third contact sets mounted in horizontally spaced relation from one another on said elongated insulating member, each of said contact sets including a plurality of stationary electrical contacts positioned in an arc pattern around and equidistant from an axis of rotation,

first, second and third rotatable contacts pivotably mounted from a first side of said elongated insulating member on the axes of said first, second and third contact sets, respectively, for selective engagement with the associated stationary electrical contacts,



said tap leads from the first, second and third winding phases being connected to the first, second and third contact sets and their associated rotatable contacts, respectively,

an elongated operating member mounted for linear movement on a common side of said insulating member,

first, second and third coupling means operatively connected between said elongated operating member and said first, second and third rotatable contacts, respectively, said first, second and third coupling means translating linear movement of said elongated operating member to rotary movement of said first, second and third rotatable contacts, respectively,

and rotary operating means operable from outside of said tank, said rotary operating means including fourth coupling means operably connected to said elongated operating member for translating rotary movement of said rotary operating means to linear movement of said elongated operating member.

4,013,848

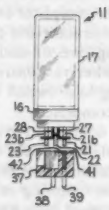
SPRING SHORTING MEANS FOR PHOTOFLASH ARRAY

Donald R. Schindler, Burton Township, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 2, 1975, Ser. No. 538,037

Int. Cl.² H01R *13/70*

U.S. Cl. 200—51.1 **9 Claims**



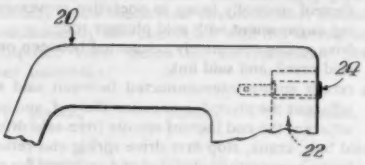
1. A flash lamp array comprising a body portion containing a plurality of flash lamps and having at least two electrical terminals extending downwardly from the underside of said body portion and being substantially mutually parallel and spaced apart from each other and adapted to be inserted into a socket having a surface, at least a first one of said terminals being provided with a lateral shoulder, and a resilient elongated member positioned below and substantially parallel to

said underside of the body portion of the array and connected electrically to a second one of said terminals and engaging resiliently against said shoulder so as to normally short-circuit said first and second terminals, said resilient elongated member being positioned to engage said surface of the socket and be lifted out of engagement with said shoulder when said array is plugged into said socket.

4,013,849
POWER PACK PLUG SWITCH

Vincent B. Brown, Prospect Heights, Ill., assignor to Methode Electronics, Inc., Chicago, Ill.

Filed Feb. 18, 1975, Ser. No. 550,867
Int. Cl.² H01R *33/30, 33/54*
U.S. Cl. 200—51.09 **8 Claims**



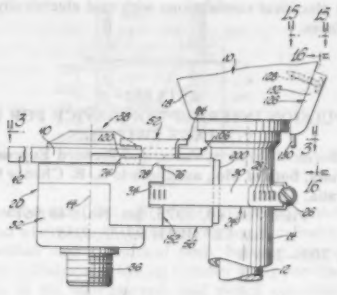
1. A plug switch for a rechargeable power pack comprising a housing, a first pair of terminal blades secured in said housing and projecting outwardly at one end thereof for insertion in an electrical socket; a carrier member slidable in said housing between first and second positions; spring means normally biasing said carrier member to said first position, an opening formed into said housing at said one end in direct communication with said carrier member for permitting engagement of said carrier member with a member associated with an electrical socket; first and second elongated contact members carried by said carrier member; each of said first pair of terminal blades having a terminal contact portion with one contact portion in continuous sliding engagement with said first elongated contact member and with the other contact portion in continuous sliding engagement with said second elongated contact portion; a second pair of terminal blades secured in said housing and projecting outwardly from one side thereof; each of said second pair of terminal blades having a contact member disposed in the path of travel of said carrier member such that said first and second elongated contact members are brought into electrical engagement, respectively, with one and the other contact members of said second pair of terminal blades upon said carrier being moved to said first position; a third pair of terminal blades secured in said housing and projecting outwardly from said one side; each of said third pair of terminal blades having a contact member disposed in the path of travel of said carrier member such that said first and second elongated contact members are brought into electrical engagement, respectively, with one and the other contact members of said third pair of terminal blades upon said carrier being moved to said second position.

4,013,850
TURN SIGNAL ASSEMBLY AND SELF-CANCELLING MEANS ATTACHABLE EXTERNALLY TO A STEERING COLUMN POST

Dale L. Bull, Reed City, Mich., assignor to Nartron Corporation, Reed City, Mich.

Filed Apr. 7, 1975, Ser. No. 565,480
Int. Cl.² H01H *3/16, 9/00;* **B60Q** *1/00*
U.S. Cl. 200—61.27 **19 Claims**

1. A turn signal switch and assembly for an associated vehicle having manually controlled vehicular steering gear means and steering gear column housing means, comprising turn signal switch housing means for enclosing and containing actuatable electrical switching members therein, rotatable selector lever means carried by said switch housing means generally externally thereof, said selector lever means being selectively manually rotatably positionable into a neutral position and any of a plurality of operating positions as to thereby accordingly actuate said switching members within said switch housing means, abutment means operatively carried by said selector lever means as to be situated externally of said switch housing means, motion transmitting means situated generally externally of said switch housing means and having a first portion in operative juxtaposition to said abutment means, said motion transmitting means further comprising a second portion adapted to be at times operatively engaged by actuating means moving in response to indicia of said steering gear means being actuated to steer said associated vehicle in a non-linear path, said actuating means being effective when said selector lever means has been selectively positioned in one of said operating positions corresponding to a

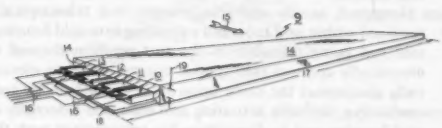


left-turn operation of said associated vehicle and when said steering gear means is being actuated in a right-turn direction to engage said motion transmitting means and thereby forcibly cause said motion transmitting means to react against said abutment means to thereby cause said selector lever means to be rotated from said one of said operating positions to said neutral position, and support body means situated externally of said switch housing means, said support body means being separate from said switch housing means and effective to support said motion transmitting means, said support body means comprising first mounting surface means effective for operative mounting engagement with said column housing means externally thereof and second mounting surface means effective for operative mounting engagement with said switch housing means as to thereby position said switch housing means externally and eccentrically of said column housing means.

4,013,851
VEHICLE DETECTION APPARATUS

Cosmo Abbondante, Burlington, Mass., assignor to Bofors America, Inc., Linden, N.J.

Filed July 25, 1975, Ser. No. 598,930
Int. Cl.² H01H *13/16*
U.S. Cl. 200—86 R **9 Claims**



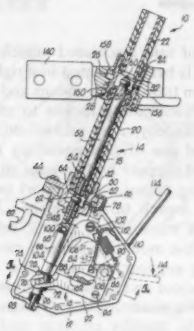
1. Apparatus for closing an electrical circuit during application of force by a vehicle tire or the like, comprising a relatively thin, narrow and elongated contact member having a flexibility which tends to preserve a substantially flat condition thereof following its bending transverse to its direction of

elongation, substantially rigid holder means having an elongated open-topped shallow channel therein, said contact member being fitted within said channel with long edges of said member confined against lateral movement thereby, said contact member having electrically-conductive lower surfaces disposed opposite substantially flat electrically-conductive upper surfaces within said channel, thin and narrow elongated spacer means under the long margins of said contact member and confined to the marginal areas thereof, said spacer means normally maintaining a relatively minute spacing between said electrically-conductive surfaces while permitting said lower surfaces to be deflected into non-wiping broad-area engagement with said upper surfaces upon application of force to the top of said contact member, substantially yieldable means padding the areas above said top of said contact member and transmitting forces applied thereto to said contact member, said yieldable means being in continguous unbonded relationship with said top of said contact member, and means making separate electrical connections with said electrically-conductive surfaces.

4,013,852
EXPULSION INTERRUPTION DEVICE FOR HIGH VOLTAGE SWITCHES

Gerald Bernard Roberts, Paris, and Richard Eugene Roberts, Centralia, both of Mo., assignors to A. B. Chance Company, Centralia, Mo.

Filed Feb. 10, 1975, Ser. No. 548,561
Int. Cl.² H01H *33/12, 9/38*
U.S. Cl. 200—146 R **4 Claims**



1. An arc-suppressing interrupter adapted to be interposed in an electrical circuit in conjunction with a blade-type disconnect switch for actuating the interrupter, the latter comprising:

a closed housing;

an elongated expulsion tube attached to said housing and in communication with the interior thereof, the interior of said tube being formed of arc-suppressing material;

spaced electrical contacts within said tube;

means for electrically connecting one of said contacts with said circuit;

an elongated, axially shiftable plunger rod telescopically received within said tube and extending into said housing, said rod being operable in the rest position thereof to electrically connect said spaced contacts, and to electrically disconnect the same upon axial shifting of the rod;

a conductive, shiftable actuating arm mounted externally of said housing and in disposition for engagement with the blade of said switch during opening of the latter, said arm being engageable and shiftable with said blade during opening thereof prior to termination of current flow through said blade;

means electrically connecting said actuating arm and the other of said electrical contacts for defining a shunt path through the latter and said plunger rod normally electrically interconnecting the spaced contacts; and

actuating means positioned within said housing and operably coupled to said plunger rod and actuating arm respectively, said actuating means including:

a generally L-shaped link having elongated first and second leg sections, said link being operably coupled adjacent the end of said first leg section to said plunger rod, and pivotally supported within said housing at a point adjacent the end of said second leg section;

an elongated crank having link-engaging structure thereon pivotally supported intermediate the ends thereof within said housing and operably coupled with said actuating arm for pivoting of the crank in response to said movement of the actuating arm;

a stop arm pivotally supported within said housing adjacent one end of the stop arm, with the remaining end thereof normally being in operative movement-blocking engagement with said plunger rod;

a drive spring operatively connected between one end of said crank and said link;

a return spring interconnected between said stop arm adjacent the pivotal connection thereof, and said crank adjacent the end thereof remote from said drive spring;

said link, crank, stop arm drive spring and return spring being cooperatively located and arranged for extending said drive spring and tensionably energizing the same upon pivoting of said crank in response to said movement of the activating arm, and for extending and tensionably energizing said return spring upon said pivoting of said crank,

said stop arm and crank having respective engagement surfaces located for causing said crank to engage said stop arm, after the crank has been pivoted a predetermined distance to accomplish said tensionable energization of said drive and return springs, for pivoting of said stop arm out of said movement-blocking disposition to clear said plunger rod, in order to permit said drive spring to quickly pull said link towards said crank with consequent deenergization of said drive spring for axial, electrical disconnecting movement of said plunger rod,

said return spring, after said deenergization of said drive spring, being operable for simultaneously pivoting said stop arm and crank for causing said link-engaging structure to engage said link for return movement of said plunger rod back to said rest position, and for return movement of said stop arm back to said normal movement-blocking disposition.

4,013,853
MULTI-PHASE COMPRESSED-GAS CIRCUIT-BREAKER CONSTRUCTION

Thomas E. Alverson, Brookfield, Ohio; Otto H. Soles, North Huntingdon, Pa.; Melvyn D. Hopkins, Pittsburgh, Pa., and Charles E. LeRow, Jr., Jeannette, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 27, 1974, Ser. No. 527,930
Int. Cl.² H01H *33/54*
U.S. Cl. 200—148 B **2 Claims**

1. A multi-phase compressed-gas circuit-breaker installation comprising, in combination:

a. means defining a generally-rectangularly-shaped lower main metallic support frame;

b. upstanding metallic legs disposed at the corners of said generally-rectangularly-shaped lower main metallic support frame for supporting said rectangular support frame a predetermined distance above foundation level;

c. a plurality of laterally-spaced upstanding generally-cylindrically-shaped circuit-breaker assemblies (**13,14**) extending upwardly from and supported by said lower main rectangularly-shaped metallic support frame;

d. first line-terminal connecting means (**39**) for each cir-

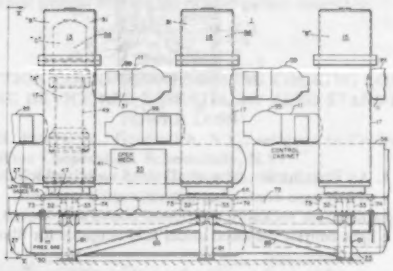
cuit-breaker assembly disposed adjacent the upper end of the respective circuit-breaker assembly;

e. cooperable second line-terminal connecting means (39) disposed below the aforesaid first-mentioned first line-terminal connecting means (39) yet spaced upwardly from said main lower-disposed rectangularly-shaped metallic support frame;

f. pressure-operated separable power contact means for each circuit-breaker assembly disposed internally thereof and interposed between the respective pair of first and second line-terminal connecting means;

g. valve means provided for each circuit-breaker assembly for causing the actuation of the pressure-operated power contacts thereof and disposed internally thereof and also above said metallic support frame;

h. horizontally-extending valve-rod actuating linkage supported by said support frame and extending generally horizontally below the several circuit-breaker assemblies and mechanically interconnected with the several interiorly-disposed valve means for the respective circuit-breaker assemblies;



i. said valve-rod actuating linkage being disposed in the available space between the support frame and the foundation level;

j. a horizontally-extending high-pressure gas-reservoir extending lengthwise of the circuit-breaker assembly and supported by said support frame;

k. gas-conduit means interconnecting said high-pressure gas-reservoir tank and each circuit-breaker assembly;

l. an operating mechanism housing compartment disposed above the support frame and interposed between two adjacently-disposed circuit-breaker assemblies;

m. said mechanism compartment housing containing an operating mechanism for operating said horizontally-extending valve-rod linkage;

n. means providing at least one low-pressure gas-reservoir tank disposed rearwardly of the lower-disposed rectangularly-shaped frame support and extending generally horizontally; and,

o. gas-conduit means interconnecting said horizontally-extending low-pressure gas-reservoir tank with each circuit-breaker assembly.

4,013,854

COAXIAL SWITCH

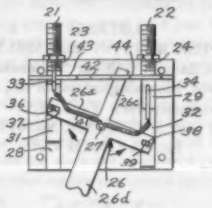
Lester J. Workman, P.O. Box 5547, Sarasota, Fla. 33579

Filed Apr. 14, 1975, Ser. No. 567,764

Int. Cl.² H01H *33/66*

U.S. Cl. 200—153 S **8 Claims**

1. A coaxial switch including a switch body having a metallic walled recess therein, an input coaxial line connection mounted to a wall of said switch body and including a central conductor communicating with said metallic walled recess, a plurality of output coaxial line connections mounted to a wall of said switch body and each including a central conductor communicating with said metallic walled recess, a switch operator including at least one connecting pin for positive engagement in a central conductor of an output coaxial line connection, electrical connection means connecting said connecting pin to the central conductor of said input coaxial line, connecting mounting means mounting said switch operator for selective movement between a plurality of positions with said at least one connecting pin engaging the central conductor for a different one of said output coaxial line connections at each of the plurality of positions, and at least one conductive shielding member separate from but operatively coupled to said switch operator and moved in accordance therewith, said shielding member moved by said switch operator to a position immediately adjacent and covering all of the central conductors of the plurality of output coaxial connections other than the one engaged by said connecting pin, wherein said switch body housing has a cylindrical configuration with said input coaxial connection disposed at an end of the cylindrical switch body housing and said output coaxial connec-



tions disposed around the wall of the cylindrical switch body housing, and wherein said shielding member is cylindrical and disposed within said cylindrical body housing for rotation therein, said cylindrical shielding member being provided with an aperture in the wall thereof, said switch operator being mounted to an end of said cylindrical body housing and having a control portion external to said housing and another portion including said connecting pin within said housing, said switch operator being mounted such that said connecting pin can be both rotated and longitudinally displaced between engaged and disengaged positions by said control portion, said connecting pin extending through the aperture in said shielding member and positively engaging the central conductor of one of the output coaxial connections when engaged, said connecting pin and said shielding member both being rotated by said control portion so that said connecting pin is always aligned with the aperture in said shielding member.

4,013,855

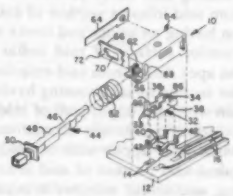
MODULAR PUSHBUTTON SWITCH

John Erwin Reichen; Richard Neff Meyer, both of Portland, and Gary William Reed, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 17, 1975, Ser. No. 558,580

Int. Cl.² H01H *9/00*

U.S. Cl. 200—314 **13 Claims**



1. Pushbutton switch means comprising:

dielectric means having spaced stationary electrical contact means;

housing means having a contact-carrying means movably disposed therein;

movable electrical contact means mounted on said contact-

carrying means for electrical engagement with said stationary electrical contact means;

retaining means provided by said dielectric means and said housing means for latchably retaining said housing means onto said dielectric means;

spring-biased actuator means extending through said housing means and being connected to said contact-carrying means for moving said contact-carrying means and said movable electrical contact means thereon between first and second positions so that said movable electrical contact means moves into and out of electrical engagement with said stationary electrical contact means; and

latching means provided in said housing means and by said actuator means and being movable by actuation of said actuator means to latch said contact-carrying means in one of said first and second positions.

4,013,856

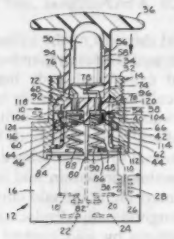
PUSH BUTTON ASSEMBLY

Roger V. Joss, Clinton; William Semonchik, Normal, and Arthur H. Unwin, Bloomington, all of Ill., assignors to General Electric Company, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 619,088

Int. Cl.² H01H *9/20*

U.S. Cl. 200—314 **7 Claims**



1. A push button assembly including an operating unit and a switch unit having an enclosure, said operating unit comprising:

a. a housing fastened to said switch unit enclosure and having a hollow interior section;

b. a collar member having one end positioned within said interior section of said housing and another end extending outward therefrom;

c. a mushroom head fixed to said another end of said collar member;

d. an actuating plunger having one end mechanically coupled to said one end of said collar member, and having another end coupled to said switch unit;

e. means for maintaining said collar member in a first position comprising:

i. means for biasing said collar member in the direction outward from said interior section of said housing;

ii. a projection having an upper and lower wall extending from an exterior surface of said collar member and joining at an apex distal from said exterior surface; and

iii. said interior section of said housing having a portion in juxtaposition with said upper wall of said projection to limit the outward movement of said collar member, whereby when said upper wall of said projection is pressed against said portion of said interior section of said housing, said collar member is maintained in the first position; and

f. means for maintaining said collar member in a second position comprising:

i. a washer member, having a flat surface positioned within said interior section of said housing;

ii. a spring seat, having a first flat surface, fixed within said interior section of said housing; and

iii. a spring member biased toward said exterior surface of said collar member and positioned between the planes formed by the respective flat surfaces of said washer member and said spring seat, whereby said collar member is maintained in the second position when said spring member is squeezed between said upper wall of said projection and said flat surface of said washer member.

4,013,857

ILLUMINATION-TYPE SMALL-SIZED SWITCH

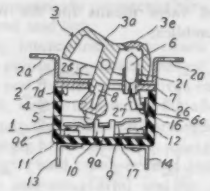
Yukihisa Tanaka, Tokyo, Japan, assignor to Nihon Kaiheiki Industrial Company, Ltd., Tokyo, Japan

Filed May 14, 1975, Ser. No. 577,206

Claims priority, application Japan, June 12, 1974, 49-67364[U]

Int. Cl.² H01H *9/16*

U.S. Cl. 200—315 **8 Claims**



1. An illumination-type small-sized switch which comprises

a switch case containing therein switch contacts;

an actuator rockably positioned above said switch case;

a light emitter disposed under said actuator for illuminating the same; and

an insulating plate placed on the upper surface of said switch case for supporting said light emitter,

said insulating plate having a circular opening and being formed on its upper surface with a resilient cylinder-shaped rising piece surrounding said opening, and said lignt emitter being fitted into said rising piece.

4,013,858

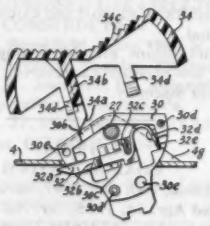
ROCKER SWITCH WITH INTEGRAL OFF LOCK

Stuart W. Grebner, Garner; James V. Johnson, and Leonardus J. Josemans, both of Smithfield, all of N.C., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed July 2, 1975, Ser. No. 592,411

Int. Cl.² H01H *3/02*

U.S. Cl. 200—321 **11 Claims**



1. A self-enclosed rocker switch comprising:

an insulating housing;

stationary contact means within said housing connected to external terminals;

movable contact means within said housing selectively operable to an "on" position closing a circuit with respect to said stationary contact means or to an "off" position opening said circuit;

a rocker assembly;

supporting means on said housing pivotally mounting said rocker assembly for rocking movement to actuate said movable contact means;

and said rocker assembly comprising:

contact actuator means extending into said housing for actuating said movable contact means to said "on" or "off" position;

a spring-biased locking member having a locking position and an unlocking position and projecting from said contact actuator means in its said locking position to catch on said housing thereby to prevent pivotal movement of said rocker assembly;

and a removable rocker button having high end portions with a valley therebetween and means for coupling the same to said contact actuator means so that selective depression of one of said high end portions effects pivotal movement of said rocker button and said contact actuator means coupled thereto and means on said rocker button operable when inserted into said contact actuator means together with said coupling thereof for moving said locking member against the force of its bias spring into said unlocking position clear of said housing to afford normal pivotal movement of said rocker assembly.

4,013,859

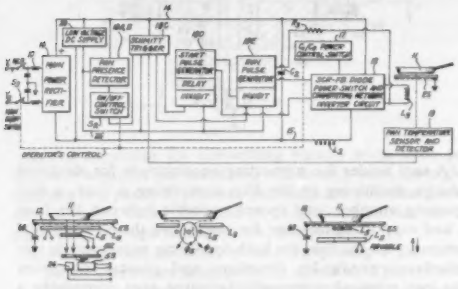
INDUCTION COOKING UNIT HAVING COOKING LOAD SENSING DEVICE AND ESSENTIALLY ZERO STAND-BY POWER LOSS

Philip H. Peters, Jr., Greenwich, N.Y., assignor to Environment/One Corporation, Schenectady, N.Y.

Filed June 4, 1975, Ser. No. 583,662

Int. Cl.² H05B *5/04*

U.S. Cl. 219—10.49 **39 Claims**



1. In an induction cooking unit having essentially zero stand-by power requirements and comprising high frequency power inverter circuit means for developing relatively high frequency power excitation currents for supply to an induction heating coil connected to and excited by said high frequency power inverter circuit means and gating circuit means coupled to and controlling operation of the high frequency power inverter circuit means; the improvement comprising induction heating load sensing and control means for sensing the presence of a load located in induction heating relationship with respect to the induction heating coil and for controlling operation of the power inverter circuit means, said induction heating load sensing and control means comprising low power, high frequency electric sensing signal generating means for deriving a high frequency electric sensing signal having a frequency different from that at which the induction heating coil is excited, load sensing coil means coupled to and excited by said high frequency electric sensing signal generating means, said load sensing coil means being physically positionable adjacent an induction heating coil in a location to provide inductive coupling of the high frequency electric sensing signal to a load being inductively heated and including means for minimizing the effect of inductive coupling from the induction heating coil at the induction heating coil excitation frequency, detector means responsive to the high frequency electric sensing signal derived from said load sensing coil for detecting changes induced in the high frequency electric sensing signal by the presence of an induction heating load, and means for coupling the output from said detector means to control operation of the gating circuit means of an induction cooking unit.

27. An induction cooking unit pan load sensing device for sensing the presence of a pan load located in induction heating relationship with respect to an induction cooking coil, said pan load sensing device comprising low power, high frequency oscillatory sensing electric signal generating means for deriving high frequency electric sensing signal having a frequency different from the frequency at which the induction heating coil is excited, pan load sensing coil means coupled to and excited by said high frequency oscillator sensing electric signal generating means, said pan load sensing coil means being physically positioned adjacent an induction cooking coil in a location to provide inductive coupling of the high frequency oscillatory sensing electric signal to a pan load being inductively heated and including means for minimizing the effect of inductive coupling from the induction cooking coil, pan load sensing detector means responsive to the high frequency sensing electric signal emitted by said pan load sensing coil for detecting changes induced in the high frequency sensing electric signal by the presence of a pan load to be inductively heated, and means for deriving a control output signal from said pan load detector means to control operation of an induction cooking unit.

4,013,860

HAND HELD ELECTRO-MECHANISM SEALER

Craig Hosterman, Paradise Valley; William E. Michel, Scottsdale, and Dale R. Oldham, Phoenix, all of Ariz., assignors to Engineering & Research Associates, Inc., Tucson, Ariz.

Filed Apr. 9, 1976, Ser. No. 675,235

Int. Cl.² H05B *9/04;* **B32B** *19/02*

U.S. Cl. 219—10.81 **14 Claims**

1. A hand held sealer for sealing heat weldable tubing, said sealer having an electrically attached electrical power supply for generating Rf power, said sealer comprising in combination:

a. a body for receiving the tubing;

b. a pivotable handle for actuating operation of said sealer;

c. a pair of jaws for compressing the tubing therebetween, one of said pair of jaws being positionably biased in response to pivotal movement of said handle;

d. means disposed intermediate said handle and said one movable jaw for translating pivotal movement of said handle into translatory movement of said one movable jaw;

e. resonant circuit means disposed within said handle for applying Rf power across the tubing compressed intermediate said pair of jaws, said resonant circuit including a variable capacitor developed by said pair of jaws for regulating the applied power by bringing said resonant circuit into and out of tune as the position of said one movable jaw varies;

f. a pre-load capacitor electrically connected to said resonant circuit for developing an initial state of tune of said resonant circuit during initial compression of the tubing intermediate said pair of jaws, whereby said pre-load capacitor insures that sufficient flow of Rf power will occur across said pair of jaws to heat and soften the initially compressed tubing;

g. first switch means responsive to pivotal movement of said handle for electrically interconnecting said resonant circuit with the power supply;

h. timing means for generating a first electrical signal at the conclusion of a first time period and for generating a second electrical signal at the conclusion of a second time period;

i. second switch means responsive to said timing means for electrically disconnecting said pre-load capacitor from said resonant circuit at the conclusion of said first time period; and

j. third switch means responsive to said timing means for electrically terminating the flow of Rf power from the power supply to said resonant circuit at the conclusion of said second time period;

whereby, the initial heating of the tubing during said first time period allows sufficient compression of the tubing by said pair of jaws to render the capacitive effect of said pair of jaws sufficient to bring said resonant circuit into tune during said second time period without the capacitance contributed by said pre-load capacitor and permit maximum power transfer across the tubing to establish a weld whereafter further movement of said pair of jaws de-tunes said resonant circuit to diminish the flow of power across the tubing and prevents rupture of the heated tubing.

4,013,861

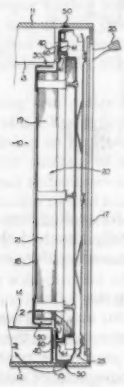
MICROWAVE OVEN DOOR SEAL

John Lloyd Westfall, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.

Filed Aug. 13, 1975, Ser. No. 604,259

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 D **5 Claims**



1. A device for suppressing leakage of microwave energy from the space defined by a door and a wall of an oven cavity of a combination thermal microwave oven, said device comprising:

a. a flexible conductive gasket for conductively sealing said door to said wall of said cavity;

b. a choke means for electrically shorting leaking microwave energy passing between said door and said wall of said cavity, said choke means disposed around said door and formed from said wall of said cavity, said door and said flexible conductive gasket, said choke formed such that minimum current in the electrical short occurs near said flexible conductive gasket;

c. a means for absorbing the microwave energy leaking from said oven cavity and by-passing said flexible conductive gasket and said choke means;

Whereby said flexible conductive gasket maintains physical and conductive contact with said wall of said oven cavity, thereby maintaining the integrity of said choke means.

4,013,862

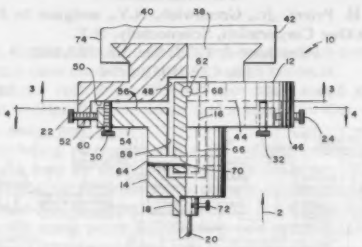
TRANSVERSELY AND ANGULARLY ADJUSTABLE TOOL HOLDER EDM ELECTRODES

Thomas J. O'Connor, 100 Morgan Road, Ann Arbor, Mich. 48106

Filed Jan. 17, 1975, Ser. No. 541,738

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 E **5 Claims**



1. A tool holder for supporting an electrode for electrical discharge machining or the like, comprising a base, a tool supporting member, and means operable between the base and tool supporting member for supporting the tool supporting member on the base for both transverse movement in two relatively perpendicular directions and pivotal movement about two relatively perpendicular pivot axes comprising a first shaft secured to said base, a second shaft secured to said tool supporting member and extending axially perpendicular to said first shaft, and a connecting member having a pair of openings therethrough extending perpendicular to each other receiving said first and second shafts therein.

4,013,863

METHOD OF FINISHING A WORKPIECE OF A NON-CONDUCTING MATERIAL, PARTICULARLY DIAMOND, BY MEANS OF SPARK EROSION

Cornelis van Osenbruggen; Johannes van Ruler, and Theodorus Maria Berendina Schoenmakers, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 471,041, May 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 437,324, Jan. 28, 1974, abandoned. This application Nov. 3, 1975, Ser. No. 628,090

Claims priority, application Netherlands, Feb. 7, 1973, 7301683

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 D **4 Claims**

1. In the method of finishing a workpiece of a non-conducting material by means of spark erosion in which a voltage is

applied between the surface of the workpiece present in a dielectric liquid and an electrode also present in the dielectric liquid to effect a spark-over between the workpiece and the electrode, the improvement wherein said dielectric liquid is an emulsion of an aqueous solution of an electrolyte in an organic dielectric liquid and a surfactant, the drops of said emulsion being smaller than the wavelength of visible light.

4,013,864

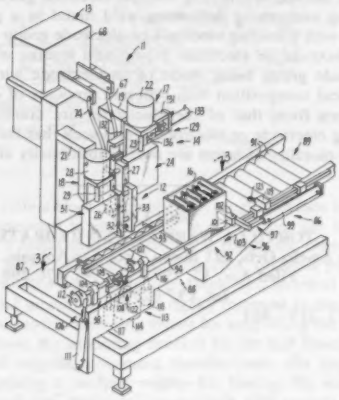
APPARATUS FOR FABRICATING THROUGH-THE-WALL BATTERY CONNECTORS

Ernest G. Tiegel, Redwood City, and Ralph G. Tiegel, San Carlos, both of Calif., assignors to Tiegel Manufacturing Company, Belmont, Calif.

Continuation-in-part of Ser. No. 753,137, Aug. 16, 1968. This application Mar. 6, 1975, Ser. No. 555,883

Int. Cl.² B23K *19/00;* **H01M** *10/12*

U.S. Cl. 219—80 **34 Claims**



1. An apparatus for connecting battery plate units positioned in adjacent cell chambers of a battery case, through an aperture in a partition between said adjacent cell chambers by extruding and fusing the lead of projections carried on said plate units through said aperture, comprising:

a. an electrode assembly means comprising a pair of opposed electrodes adapted to fit about said partition and into said adjacent cell chambers and overlie said projections, said electrodes being configured and dimensioned relative to said aperture to extrude a portion of each of said projections into said aperture;

b. means for moving said electrodes relatively toward each other for forcing said plate unit projections against said partition and for extruding a portion of each of said projections into said aperture and into contact with each other within said aperture; and

c. means for passing an electric current through said electrodes for fusing said lead in and at the aperture and forming an intercell connection between said plate units and said cells.

4,013,865

METAL HONEYCOMB WELDING APPARATUS AND METHOD

Everett E. Jones, Wichita, Kans., assignor to The Boeing Company, Seattle, Wash.

Filed July 29, 1974, Ser. No. 492,497

Int. Cl.² B23K *11/14*

U.S. Cl. 219—117 HD **12 Claims**

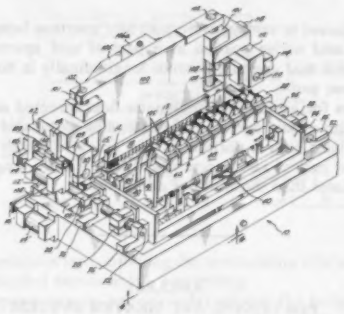
1. Welding apparatus for making honeycomb core panels from corrugated metal strips, said strips having raised projection arrays thereon comprising:

a base on which the core panel under fabrication is positionable with one end thereof substantially coincident with a welding station extending across the base;

first movable electrode means insertable within and retractable upwardly from core cells adjacent said welding station to establish electrical contact with inwardly facing surfaces of outer apices on said core, said first electrode means further movable between a first, strip engaging, position to a second welding position while engaged with said core whereby said core is advanced through said apparatus;

second movable electrode means insertable within and retractable downwardly from core cells adjacent said welding station to establish electrical contact with inwardly facing surfaces of outer apices on said core, said second electrode means further movable between a first, strip engaging, position to a second welding position while engaged with said core whereby said core is advanced through said apparatus;

welding means movable on said base from a strip-receiving



location to said welding station, said welding means including strip positioning means to receive and carry a corrugated metal strip into registry with said core with said raised projection arrays between said strip and said core whereby honeycomb cells are formed and further including at least one welding element engageable with the apices of said strip to impose welding current simultaneously across all said raised projection arrays at a node, to form a series of spot welds at said node;

means to move said first and said second movable electrode means in a sequence from strip engaging position wherein said welding means brings said strip into contact with said electrode means to a welding position wherein said strip is welded to said core forming cells, then return to said strip engaging position by withdrawing said electrode means from said cells, said means to move said first and said second movable electrode means alternatively moving said first and said second electrode means in said sequence; and

means to impose a welding current between said welding elements and said electrodes.

4,013,866

PLASMA TORCHES

Thomas Joseph Fox, Loughborough, and John Ernest Harry, Edmondthorpe, both of England, assignors to National Research Development Corporation, London, England

Filed Mar. 4, 1976, Ser. No. 663,992

Claims priority, application United Kingdom, Mar. 5, 1975, 09148/75

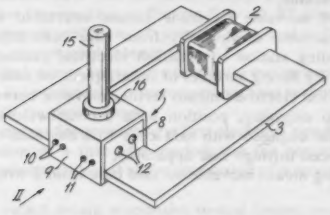
Int. Cl.² B23K *9/08*

U.S. Cl. 219—121 P **10 Claims**

1. A heating device comprising: a plasma torch incorporating

a hollow structure having an inlet and an outlet by means of which a stream of gas may be passed through said structure, said outlet being constituted by a conductive nozzle having an elongated exit aperture whose length is much greater than its width, and

at least one internal electrode having an active portion disposed within said structure out of contact with said nozzle, said active portion having dimensions small compared with the length of said aperture and being disposed



adjacent to said aperture with said aperture being closest to said active portion at a part of said aperture from which said aperture extends longitudinally in both directions; and

means for generating a magnetic field directed across the width of said aperture and extending along said aperture at least over a portion of said aperture which contains said part of said aperture and which has a length much greater than the width of said aperture.

4,013,867

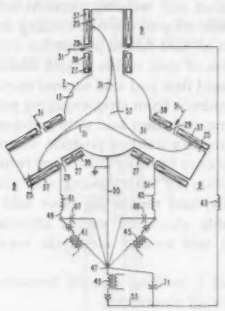
POLYPHASE ARC HEATER SYSTEM

Maurice G. Fey, Plum Borough, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 11, 1975, Ser. No. 603,579

Int. Cl.² H05B *7/18*

U.S. Cl. 219—121 P **10 Claims**



1. An arc heater system as a high energy heat source comprising a housing forming a plenum chamber, a plurality of arc heaters mounted on the housing and extending substantially radially thereon, each arc heater comprising a downstream electrode adjacent the housing and an upstream electrode remote therefrom and an intermediate gap therebetween, a polyphase wye-connected power system comprising one conductor for each phase and a neutral conductor, the upstream electrodes of each arc heater being connected to one of the phase conductors respectively, the downstream electrodes being connected to the neutral conductor, whereby arc heated jet streams from the arc heaters merge and project into the housing.

4,013,868

METHOD OF MULTIPLE GAS SHIELDED ARC WELDING

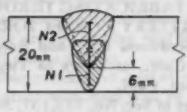
Fusao Koshiga, Kawasaki; Jinkichi Tanaka, and Itaru Watanabe, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 19, 1975, Ser. No. 633,384

Claims priority, application Japan, Nov. 26, 1974, 49-135180

Int. Cl.² B23K *9/24*

U.S. Cl. 219—137 WM **3 Claims**



1. A method of effecting multiple electrode gas shielded arc welding comprising depositing weld metal in a plurality of layers with a leading electrode or electrode group and a trailing electrode or electrode group; said leading electrode or electrode group being made of an electrode wire having a chemical composition with different amounts of deoxidizing elements from that of the electrode wire constituting said trailing electrode or electrode group such that the properties of the plurality of layers are made substantially uniform.

4,013,869

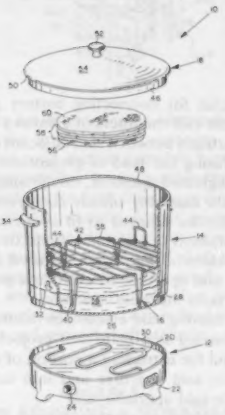
TORTILLA WARMER AND HYDRATER

Maria Amelia Orts, 221 Buena Vista, San Antonio, Tex. 78207

Filed Apr. 12, 1976, Ser. No. 676,298

Int. Cl.² F27D *11/02*

U.S. Cl. 219—401 **4 Claims**



1. An apparatus adapted for warming and hydrating cold, dry tortillas, said apparatus comprising:

base means having a resistive heating element located therein, said resistive heating element being adapted for connection to a source of electric power;

cylindrical container means located on said base means, said cylindrical container means having an upper opening and being adapted for receiving water therein;

rack means insertable through said upper opening, said rack means being suspended at a predetermined horizontal plane above a bottom of said container, said rack means allowing free fluid flow therethrough;

an upper cloth pad and a lower cloth pad located on said rack means and being adapted for receiving said tortillas to be warmed and hydrated therebetween

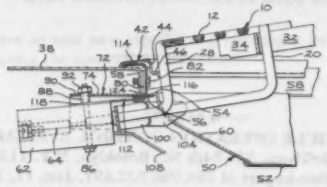
cover means for covering said opening of said container means;

thermostat means connected to said resistive heating element, said thermostat means controlling current flow through said resistive heating element to maintain temperature of water in said cylindrical container means at a predetermined level to produce steam and heat said tortillas.

4,013,870
TERMINAL BLOCK MOUNTING FOR A PLUG-IN SURFACE HEATING UNIT

Glen H. Summers, Elmhurst, Ill., assignor to General Electric Company, Louisville, Ky.

Filed June 4, 1976, Ser. No. 692,956
Int. Cl.² H05B 3/68
U.S. Cl. 219—451 **5 Claims**

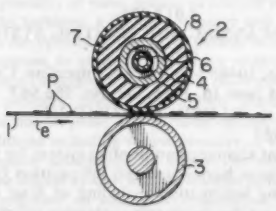


1. In a terminal block assembly for a plug-in surface heating element supported in an opening in a cooktop, the heating element is a metal sheathed electrical resistance element of spiral form with radial, outwardly-directed, terminal portions in close formation which plug into a dielectric terminal block, a sheet metal mounting bracket rigidly fastened to the cooktop, and lost-motion fastening means for supporting the terminal block from the mounting bracket for limited freedom of vertical and angular movement therebetween, the improvement comprising a resilient means for biasing the movable terminal block into its uppermost position with respect to the mounting bracket, said spring means being a folded spring blade having a tab at the top for seating on the cooktop, a vertical midsection that is fastened to the cooktop and an elongated cantilever section underlying the cooktop and fastened to the top of the terminal block, so as to normally bias the terminal block to its uppermost position with respect to the mounting bracket.

4,013,871
IMAGE FIXING ROLL FOR ELECTROPHOTOGRAPHY

Ryoichi Namiki, Hino, and Shigeru Muramatsu, Tokyo, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 328,963, Feb. 2, 1973, abandoned.
This application Apr. 15, 1975, Ser. No. 568,310
Claims priority, application Japan, Feb. 9, 1972, 47-14175; Mar. 1, 1972, 47-21209
Int. Cl.² H05B 1/02
U.S. Cl. 219—471 **22 Claims**



21. An image-fixing roller for heat-fixing electrophotographic toner images on support sheets, comprising:

an inner circumferential roller layer and an outer circumferential roller layer;

heat source means mounted within a region surrounded by at least said outer layer;

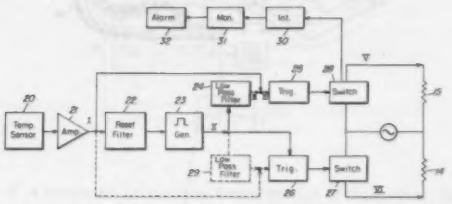
said inner layer being made of a rubber-like material which is resilient and is highly heat-conductive;

said outer layer being made of a rubber-like material which is resilient and non-tacky, with a non-abrasive outer circumferential surface having offset preventing properties, said outer circumferential surface contacting said toner images; and wherein the hardness and the thickness of the outer layer are less than those of the inner layer.

4,013,872
TEMPERATURE CONTROL DEVICE

John R. Glass, Mickleton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 2, 1975, Ser. No. 574,075
Int. Cl.² H05B 1/02
U.S. Cl. 219—497 **22 Claims**



11. Apparatus for controlling the temperature of a temperature-controlled environment, comprising:

1. temperature sensing means for sensing the temperature of the environment,
2. first signal generating means connected to the temperature sensing means for producing a first signal in proportion to the temperature,
3. second signal generating means operatively connected to the first signal generating means for producing a second signal having a periodic deviation from a reference level, the duration of the deviation from the reference level being in proportion to the first signal,
4. means for deriving from said second signal a third signal having a value which varies with time,
5. heat supply control means operatively connected to the first signal generating means and the third signal generating means for controlling the supply of heat to the environment in response to the first and third signals.

4,013,873
ELECTRIC HEATING FARROWING PAD WITH MEANS FOR OVERHEAD AND SIDE SHIELDING OF ELECTRIC CORD

Eldred Olson, Colfax, Ill., assignor to Vi-Amino Feeds, Inc., Colfax, Ill.

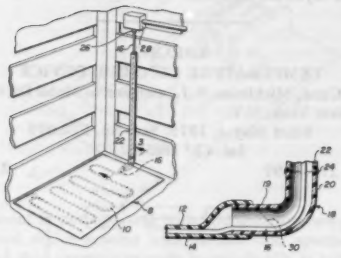
Filed Nov. 6, 1975, Ser. No. 629,581
Int. Cl.² H05B 3/08
U.S. Cl. 219—541 **2 Claims**

1. An electric heating farrowing pad having upper and lower rigid plastic walls with an electrical resistance heating element between said plastic walls, said heating element connected to an elongated electric cord with a terminating male plug, and means to shield said electric cord for connection to an electrical outlet, including

a rigid cylindrical elbow fitting through which said electric cord may pass, a horizontal arm of said elbow fitting fixed between said upper and lower plastic walls, a vertical arm joined to said horizontal arm, and

an elongated rigid cylindrical connector having a continu-

ous sidewall of easily cut material and having a length sufficient to enclose substantially the entire length of said electric cord up to about the male plug, the sidewalls of the elbow fitting and tubular connector having substantially uniform configurations and dimensions to allow end



to end coupling by selectively aligning and coupling the tubular connector end with said elbow fitting, whereby the cord maybe alternatively shielded for overhead connection by coupling the connector to said vertical arm or be shielded for sidewall connection by cutting the elbow fitting and coupling the connector to the horizontal arm.

4,013,874

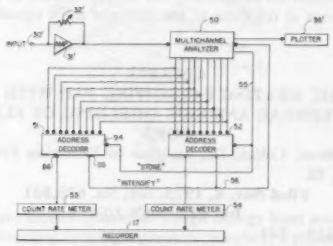
ADDRESS DECODER FOR USE WITH MULTICHANNEL ANALYZERS

Richard B. Culver, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 244,013, April 14, 1972, abandoned. This application Sept. 5, 1975, Ser. No. 610,600

Int. Cl.² G01T *1/00;* **G05B** *1/03*

U.S. Cl. 235—92 PC **5 Claims**



1. A system for producing a radioactivity log indicative of the number of gamma rays falling within at least two predetermined energy bands, comprising:

an elongated well logging instrument adapted to traverse an earth borehole;

means within said instrument for detecting gamma radiation;

means within said instrument to generate electrical signals indicative of said detected radiation;

means to transmit said electrical signals to the earth's surface from said well logging instrument;

a multichannel analyzer at the earth's surface having an unknown address scaler output, said analyzer being adapted to receive said electrical signals;

a first address decoder circuit, comprising:

means for comparing said unknown address scaler output with first and second reference words; and

means to generate a first voltage pulse in response to said address scaler having a numerical value equal to or higher than said first reference word while being less than or equal to said second reference word;

a second address decoder circuit, comprising:

means for comparing said unknown address scaler output with third and fourth reference words; and

means to generate a second voltage pulse in response to said address scaler having a numerical value equal to or higher than said third reference word while being less than or equal to said fourth reference word.

4,013,875

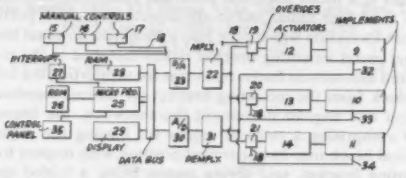
VEHICLE OPERATION CONTROL SYSTEM

Daniel R. McGlynn, 329-84th St., Brooklyn, N.Y. 11209

Continuation-in-part of Ser. No. 432,691, Jan. 11, 1974, abandoned. This application Jan. 3, 1975, Ser. No. 538,356

Int. Cl.² G06F *9/06, 15/20*

U.S. Cl. 235—150.2 **11 Claims**



1. An artificial earth satellite comprising horizon sensor means for determining the attitude of said satellite with respect to the earth; radiation sensor means for detecting the presence and position of a radiation emitting event on the surface of the earth with respect to said satellite attitude; communications means for communicating said presence and position information externally of said satellite, and a stored program digital computer in said satellite, said computer comprising storage means in which is stored information representative of operations to be performed by said communications means, and microprocessor means for receiving said stored information from said storage means, and for supplying control information to said communications means.

4,013,876

DOCUMENT SCANNING AND PRINTING SYSTEM AND METHOD

Wayne D. Anstin, 10405 Mann Drive, Cupertino, Calif. 95014

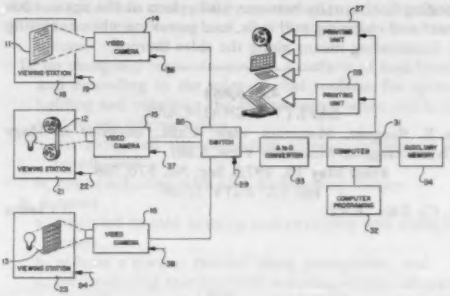
Filed June 16, 1975, Ser. No. 586,967

Int. Cl.² H04N *1/06;* **G06F** *3/14*

U.S. Cl. 235—151 **5 Claims**

1. A document scanning and printing system for producing a printed document having updated information from documents containing information including at least one video camera for viewing the documents containing information and generating an electrical signal representative of the information, means for presenting the documents containing information to said video camera whereby said camera generates said

electrical signal, means for processing said electrical signal to generate a new signal having updated information and means



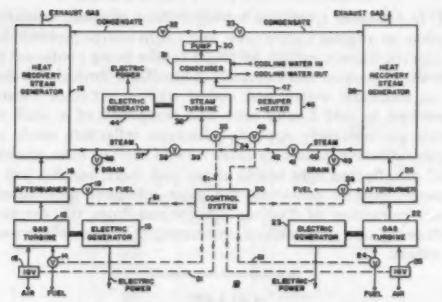
responsive to said new signal for producing a printed document having the updated information.

4,013,877

COMBINED CYCLE ELECTRIC POWER PLANT WITH A STEAM TURBINE HAVING AN IMPROVED VALVE CONTROL SYSTEM

Robert Uram, East Pittsburgh; Ross T. Marano, Murrysville; Richard S. Heiser, and Jeong Y. Surh, both of Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 13, 1974, Ser. No. 497,344
Int. Cl.² F01K *23/00*
U.S. Cl. 235—151.21 **9 Claims**



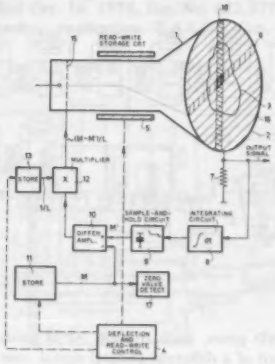
1. A combined cycle electric power plant comprising at lest one gas turbine, means for generating steam in response to heat energy from the gas turbine, a steam turbine driven by steam supplied to it from the steam generating means, means for generating electric power under the driving power of the turbine, a plurality of valve means to control the admission of steam to the turbines, a digital computer and an analog control system for operating the valve means, said digital system including means to generate repetitive output pulses in response to input voltages depending on plant conditions including steam pressure, said analog system including means to generate an output pulse of a variable duration depending on input conditions including steam pressure, a hybrid interface unit responsive selectively to either the repetitive output pulses of the digital system and the output pulse of the analog system to generate an analog representation having a value depending on the duration of the selected applied pulses, and control means for each valve means governed by the value of the analog representation to position its respective valve means.

4,013,878

DEVICE FOR AN ITERATIVE DETERMINATION OF THE VARIATION OF A FUNCTION IN A PLANE

Wolfgang Wagner, Norderstedt, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 16, 1975, Ser. No. 613,813
Claims priority, application Germany, Sept. 24, 1974, 2445482
Int. Cl.² G01T *1/00;* **G06F** *15/42*
U.S. Cl. 235—151.35 **9 Claims**



1. A device for an iterative determination of the surfacewise distribution of a function which is derived from measuring values obtained by scanning a plane of measurement along a plurality of substantially parallel strips, and wherein the resulting primary integral values associated with each strip, are stored in a first store, comprising: a read-write storage cathode ray tube having a charge storing target whereon is stored a charge image of the distribution of the function obtained during a first approximation; means for integrating output signals from the target during the reading operation of the tube; means for sampling the integral signal from the integrating means according to the length of respective scanning strips and for holding the sampled integral values; differential means for comparing the sampled integral values with corresponding primary integral values retrieved from said first store; and control means for adjusting the density of charges in each scanning strip on said target in response and proportionally to the variations of the difference signal.

4,013,879

DIGITAL MULTIPLIER

Robert Edward Bornmann, Clifton, N.J.; John Richard Cowan, Brooklyn, N.Y., and Mark Joel Schneider, Nutley, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 2, 1975, Ser. No. 582,945
Int. Cl.² G06F *7/52*
U.S. Cl. 235—164 **42 Claims**

1. A digital CMOS/LSI synchronous serial multiplier comprising:

first means to store a X-bit sign magnitude multiplier number in parallel, where X is an integer greater than one;

a first input for a serial N-bit 2's complement multiplicand, where N is an integer greater than one;

second means including (X − 1) adder stages connected in series;

third means coupled to said first means, said first input and said second means to couple each of the magnitude bits of said multiplier number into a different one of said adder stages, said adder stages performing successive additions of the magnitude bits of said multiplier to provide as an output of a last of said adder stages a serial product having M bits, where M is an integer greater than one; and

a second input for a serial Y-bit 2's complement addend coupled to a first of said adder stages to add said addend to said product;

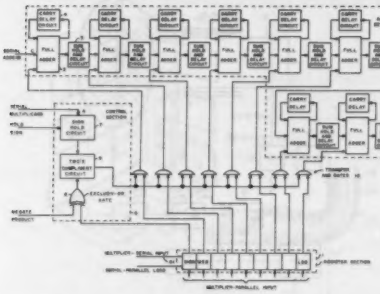
said first means including

a sign bit flip flop,

(X − 1) magnitude bit flip flops, and

(X − 1) gate circuit coupled to said sign bit flip flop and said magnitude flip flops in a predetermined manner to provide a X-bit register; and

each of said gate circuits including



two AND gates, each of said AND gates being under control of a different control signal, one of said AND gates being coupled to an output of an immediately preceeding one of said flip flops and the other of said AND gates being coupled to an associated bit of said multiplier number, and

an OR gate having two inputs each coupled to the output of a different one of said two AND gates and an output coupled to a next succeeding one of said flip flops.

4,013,880

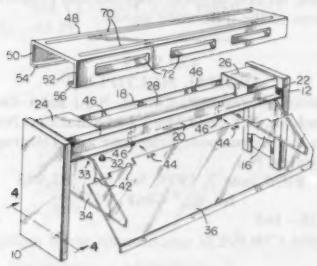
BREATH GUARD CANOPY FOR SERVING UNIT

Robert J. Kennedy, Jr., and Kendall S. Smith, II, both of West Lafayette, Ind., assignors to Lincoln Manufacturing Company, Inc., Fort Wayne, Ind.

Filed Dec. 8, 1975, Ser. No. 638,969

Int. Cl.² A47F *11/10, 3/00*

U.S. Cl. 240—2 AD **11 Claims**



1. A breath guard canopy comprising; spaced support members, means supporting said support members, at least one transparent guard element extending between and resting on said support members and inclining downwardly toward one edge, aperture means formed in said guard element near the other edge, and spring clip means engageable with said aperture means for releasably holding said guard element in place on said support members.

7. A breath guard canopy according to claim 1 which includes spaced upstanding pylons forming the means supporting said support members, rails extending horizontally between and connected to said pylons, illuminating means extending horizontally between the pylons near the upper ends thereof for illuminating the space beneath the canopy, and a cover member in the form of a downwardly opening channel extending horizontally between said pylons at the upper ends thereof and engaging said rails, said cover member enclosing said illuminating means along the sides thereof.

4,013,881

SAFETY SIGNAL CANE

Otto E. Sargent, Mountain View, Calif., assignor to Mary Elvera Sargent, Mountain View, Calif.

Filed May 19, 1975, Ser. No. 570,788

Int. Cl.² F21V *33/00*

U.S. Cl. 240—6.42 **3 Claims**

1. In a tubular type cane having a shank portion, a handle portion, an angular Lucite tube, and a light source powered by an electric battery means, said light source being contained in said shank portion and manually controllable through the use of an electrical switch and coiled wire: a reflector means contained in said Lucite tube and composed of a shaft to which are obliquely appended fin-type reflectors made of highly reflective material located on said shaft so as to provide 360° of reflected light beams about said shaft, and not just a "glow," thereby providing the most refulgent multi-directional refraction of flashing light beams from the exterior surfaces of said tube without obstructing the vision of the user or others.

4,013,882

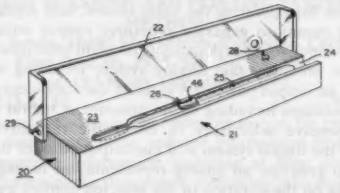
THERMOMETER CARRYING CASE AND ILLUMINATING DEVICE

Elliott E. Engler, 5 Roosevelt Road, Westport, Conn. 06880

Filed Apr. 25, 1975, Ser. No. 571,590

Int. Cl.² F21V *33/00*

U.S. Cl. 240—6.46 **11 Claims**



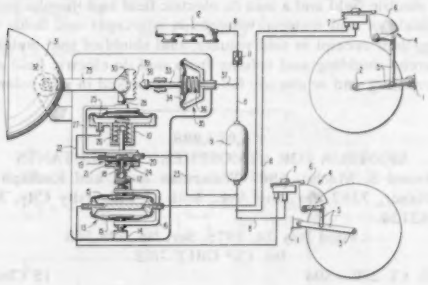
1. An illuminating device for medical thermometers comprising a housing incorporating

A. illuminating means contained within said housing;
B. access means formed in said housing for providing accessibility to said illuminating means;
C. switch means controllably connected to said illuminating means for activating and deactivating said illuminating means;
D. an elongated recess formed in a surface of said housing and extending to the edge of said surface, for securely holding and retaining the thermometer when not in use, said recess incorporating
a. an elongated slot extending along a portion of said recess, and
b. communicating with said illuminating means;
E. a cover
a. mounted to said housing and overlying said elongated recess,
b. at least a portion thereof being transparent, and
c. incorporating thermometer securing means cooperating with the recess and moveably from a thermometer entry position to a thermometer holding position, assuring secure retention of a thermometer in the recess, and
F. an elongated magnifier mounted to said cover in juxtaposed spaced relationship with said elongated recess extending at least the length of said elongated slot, and operably magnifying a thermometer's indicia whereby a medical thermometer securely positioned and retained within said recess is illuminated through said elongated slot and easily and accurately read through said transparent magnifier and cover portion.

4,013,883
PNEUMATIC CONTROL INSTALLATION FOR HEADLIGHTS

Rudolf Andres, Sindelfingen, and Hermann Möller, Aidlingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Oct. 29, 1974, Ser. No. 518,893
Claims priority, application Germany, Oct. 30, 1973, 2354204
Int. Cl.² B60Q *1/04*
U.S. Cl. 240—7.1 LJ **35 Claims**

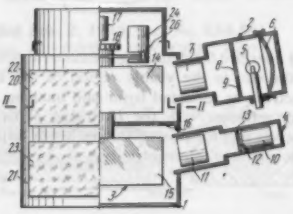


1. A pneumatically operating control installation for the automatic alignment of motor vehicle headlights which comprises means for aligning the headlights of the motor vehicle so as to have a constant light range essentially independently of the load of the vehicle including transmitter means measuring the change in distance of a respective axle with respect to the body of the motor vehicle, pressure modulator means operatively connected with the transmitter means and differential control means and control shifting means operatively connected with the pressure modulator means, characterized in that the control shifting means includes a control rod means engaging at the pivotal headlight, and servo-adjusting motor means for holding fast said control rod means in case of a pressure failure.

4,013,884
OPTICAL DEVICE FOR A SURFACE VEHICLE GUIDANCE SYSTEM USING A LIGHT-CONTRAST PROGRAMME

Rafael Rafaelovich Dvali, ulitsa Barnova, 109; Otar Vladimirovich Margvelashvili, prospekt I. Chavchavadze, 11; Alexei Dmitrievich Nozadze, prospekt Tsereteli, 69; Mikhail Erastovich Burdzgla, ulitsa Atskhurskaya, 4b, and Alexandr Nikolaevich Melitauri, ulitsa Barnova, 91, all of Tbilisi, U.S.S.R.

Filed Oct. 16, 1975, Ser. No. 622,977
Claims priority, application U.S.S.R., Oct. 24, 1974, 2069995
Int. Cl.² G05B *1/00*; H01J *3/14*
U.S. Cl. 250—202 **7 Claims**



1. An optical device for an automatic guidance system using a light-contrast pattern for a vehicle moving along a surface being explored and exhibiting the light contrast pattern, which comprises a casing; two light transmissive windows in said casing; light transmitting means housed in said casing for generating an outgoing beam of light for illuminating said surface being exposed; light receiving means housed in said casing for receiving incoming light beams reflected from said surface being explored and for converting said incoming light receiving means into electrical signals carrying the information on the position of said vehicle with respect to said surface being explored; scanning means in the nature of two mirror prisms located in said casing, a first mirror prism being placed in the path of said outgoing light beam and being rotatably mounted on an axle and adapted to successively illuminate, via one of said windows, said surface being explored, and the second mirror prism being placed in the path of said incoming light beams reflected from said surface being explored, via the other one of said windows, and being mounted on said axle, said first and second mirror prisms being spaced from each other to form a gap therebetween; partition means provided in said gap between said first and second mirror prisms and made of a substantially opaque material to prevent undesired direct light transmission between said light transmitting and receiving means; and reference signal generating means rigidly coupled to said axle of said mirror prisms for generating reference signals to synchronism with the revolution of said mirror prisms.

4,013,885
SOLAR ENERGY SUN TRACKER

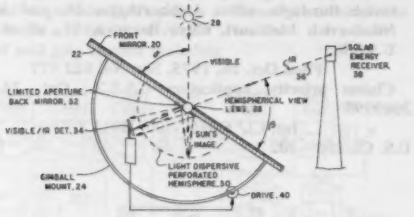
Daniel Blitz, Boston, Mass., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Jan. 8, 1976, Ser. No. 647,535
Int. Cl.² G01J *1/20*
U.S. Cl. 250—203 R **25 Claims**

1. Apparatus for use in the proper positioning of individually steerable mirrors spaced from a solar energy receiver, each mirror assembly comprising,
a front reflector having an aperture,
a support for said front reflector,
means coupled to said support for adjusting the position of said front mirror about said aperture,
an imaging surface behind said front reflector,

a reflector located in back of said front reflector surrounding said aperture and concentric therewith, said back reflector lying in a plane parallel to said front reflector, and

means located on a line from said solar receiver through



said aperture for detecting the concentricity of the images of the sun in the visible region of the electromagnetic spectrum as reflected from said imaging surface by said back reflector with the IR image of said solar energy receiver and for driving said reflector adjusting means so as to maintain concentricity.

4,013,886

LIGHT PROJECTOR AND DETECTOR UNIT

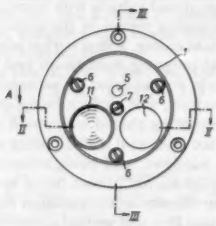
August Schmid, Schwerzenbach, Switzerland, assignor to Patentverwertungs-und Finanzierungsgesellschaft Serania AG, Glarus, Switzerland

Filed Feb. 18, 1975, Ser. No. 550,263

Claims priority, application Switzerland, Feb. 21, 1974, 2427/74

Int. Cl.² G01D *21/04*

U.S. Cl. 250—221 **8 Claims**



1. Light gate object sensing and detector unit for use with a reflecting device at the end of the gate path remote from the detector, said unit comprising:

means for projecting a beam of light towards said reflecting device, the direction of projection of said beam being the principal light projection direction of said means;

light responsive receiving means for receiving light from said reflecting device, said light responsive receiving means being located adjacent said light projecting means, having a preferential light reception direction substantially parallel to said principal light projection direction, and including photoelectric means (**10**) for producing an electric signal in response to light received;

a casing open at the front housing said projecting means and said receiving means;

adjustable support means for both said projecting means and for said receiving means, located within said casing and including a mounting body forming a front for the unit in which said projecting means and photoelectric means are set with their respective light projection and preferential light reception directions frontwardly directed and including also means for angularly adjusting simultaneously with two degrees of freedom the direction of projection of said projecting means and the preferential light reception direction of said receiving means;

optical alignment indicating means (**5**) including a light-emitting diode carried on said support means so as to be visible from the exterior of the unit for indicating the intensity of light received from said reflecting means by said receiving means, and

a two-stage transistor amplifier (**14, 15**) having its input connected to the output of said photoelectric means (**10**) and having its output connected to said light-emitting diode and also to an additional output terminal for providing an object detecting output distinct from the output of said alignment indicating means.

4,013,887

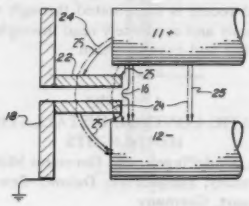
METHODS AND APPARATUS FOR SPATIAL SEPARATION OF AC AND DC ELECTRIC FIELDS WITH APPLICATION TO FRINGE FIELDS IN QUADRUPOLE MASS FILTERS

Wade L. Fite, 305 Pasadena Drive, Pittsburgh, Pa. 15215

Division of Ser. No. 346,250, March 30, 1973, Pat. No. 3,867,632. This application Jan. 8, 1975, Ser. No. 539,587

Int. Cl.² H01J *1/00, 39/34*

U.S. Cl. 250—282 **5 Claims**



1. In a method of spatially separating ac and dc electric fields, the use of a material which functions substantially as a material having high dielectric constant to the ac fields and substantially as an electrical conductor to the dc fields, the method comprising the subjecting of a spatial volume to a said ac electric field and a said dc electric field and the placing of a shield of said material whereby it intercepts said fields before their receipt in said volume, said shield of said material thereby shielding said volume from said dc electric field and permitting said ac electric field to be received in said volume.

4,013,888

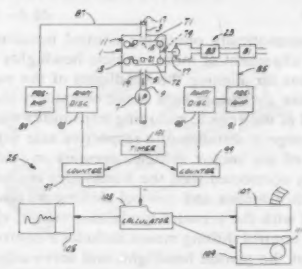
MONITOR FOR ATMOSPHERIC POLLUTANTS

Edward S. Macias, 6907 Waterman Ave., and Rudolph B. Husar, 7162 Pershing Ave., both of University City, Mo. 63130

Filed July 24, 1975, Ser. No. 598,568

Int. Cl.² G01T *7/02*

U.S. Cl. 250—304 **15 Claims**



1. Apparatus for monitoring the mass concentrations of

atmospheric pollutants above and below a predetermined size, comprising:

a receptacle having an air inlet and outlet;

means for continuously drawing air through the inlet and thence through the receptacle and the outlet;

a first collector means in the receptacle for collecting pollutants above said predetermined size, said first collector means being movable through a first station and being adapted to collect pollutants above said size from the air entering the receptacle through the inlet on successive areas thereof;

a second collector means in the receptacle for collecting pollutants below said predetermined size, said collector means being movable through a second station and being adapted to collect pollutants below said size from the air which has passed the first station on successive areas thereof;

means for holding a first source of radiation for passage thereof through said area of the first collector means at the first station;

means for detecting radiation from said first source passing through said area of the first collector means;

means for holding a second source of radiation for passage thereof through said area of the second collector means at the second station;

means for detecting radiation from said second source passing through said area of the second collector means;

means for periodically operating said collector means to move the pollutant-bearing areas thereof away from said stations and to bring fresh areas for collection of pollutants into position at said stations, the collector means dwelling between successive operations thereof; and

means responsive to said first and second detecting means for indicating the mass concentration of pollutants above and below said predetermined size for each dwell period between the successive operations of the collector means.

4,013,889

ELECTRONIC AMPLIFICATION

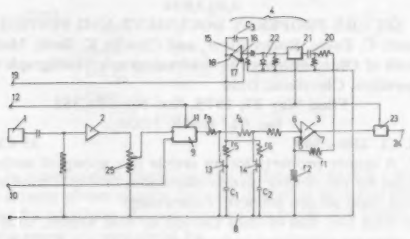
Austen John Fryer, Welwyn Garden City, England, assignor to Hawker Siddeley Dynamics Limited, England

Filed June 9, 1975, Ser. No. 584,854

Claims priority, application United Kingdom, June 13, 1974, 26234/74

Int. Cl.² H01J *31/49*

U.S. Cl. 250—332 **7 Claims**



1. For use in a scanning apparatus of the type in which a multi-detector array traverses a field of view, the detectors being sensitive to variations in electro-magnetic radiation, and wherein a plurality of video channels correspond in number with the number of detectors constituting the array, each channel being electrically coupled to a respective detector and incorporating an a.c. coupled amplifier for amplifying the signal received from the respective detector, an improvement for equalizing the gains of said amplifiers, one with another, at the end of each scan, using a reference a.c. source which is temporarily applied to input of each detector amplifier at the end of each scan in lieu of the output of the respective detector, said improvement comprising in each channel:

controllable attenuator means controlling the gain of the channel detector amplifier;

integrating amplifier means for comparing the output of the channel detector amplifier when the latter is coupled to the a.c. reference source with a further reference signal and integrating any resultant difference signal; and

means for applying integrated signal as a drive for the said controllable attenuator means to reset the gain of the channel so as to reduce the said difference signal to zero.

4,013,890

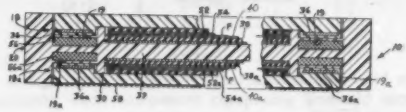
CASSETTE

Raymond M. Conrad, 745 Woodruff Road, Milford, Conn. 06460

Filed Feb. 2, 1976, Ser. No. 654,581

Int. Cl.² G03D *13/08*; **G03C** *3/00*

U.S. Cl. 250—480 **9 Claims**



1. A cassette comprising a generally rectangular body member having a generally rectangular marginal frame and an outwardly facing film support surface within the boundary of said marginal frame and cooperating therewith to define a film compartment opening outwardly through one face of said body member, said marginal frame having a continuous groove formed therein surrounding said film compartment, said groove opening outwardly through said one face, a generally rectangular panel member hingedly connected to one end of said marginal frame for movement between open and closed positions relative to said film compartment, said panel member in its closed position generally overlying said film support surface and cooperating with said marginal frame to define a substantially smooth planar surface comprising said one face, said panel member having a continuous rectangular bead at its peripheral edge received within said groove when said panel member is in its closed position and comprising a light-tight barrier around said film compartment, and magnetic coupling means for releasably retaining said panel member in its closed position and comprising strips of material including a strip of magnetic material and a strip of magnetized material, one of said strips embedded in said frame inwardly of the outwardly facing inner surface of said groove and wholly surrounded by the material of said frame, the other of said strips embedded in said bead outwardly of the inwardly facing surface of said bead and wholly surrounded by the material of said panel.

4,013,891

METHOD FOR VARYING THE DIAMETER OF A BEAM OF CHARGED PARTICLES

Wen-Chuang Ko, Wappingers Falls, N.Y., and Erich Sawatzky, San Jose, Calif., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 13, 1975, Ser. No. 641,054

Int. Cl.² H01J *37/00*

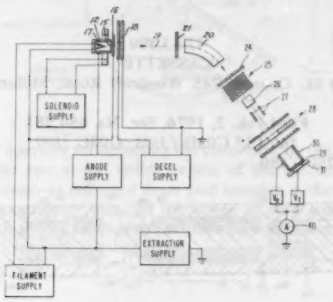
U.S. Cl. 250—492 A **10 Claims**

1. In the method of bombarding a target with a beam of primary charged particles,

a method for varying the diameter of said beam having a beam current of at least

$$\frac{V_0^{3/2}}{1.27 \times 10^{20} \sqrt{m_i} \left(\frac{L}{r_0}\right)^2} \text{ amperes}$$

where V_0 is the acceleration potential in volts of a charged particle; m_i is the mass of said particle in kilograms; r_0 is the radius of the beam at the principal plane of said lens and L is the distance from said principal plane to the focal point, comprising:



focusing the beam through a lens,

passing the focused beam through an envelope of conductive material, said envelope spaced from and coaxial with said beam, at least the portion of said envelope being disposed between said lens and beam focal point,

applying a selected D.C. electrical potential to the envelope, and

controlling the beam diameter by changing and potential in a direction away from ground potential to increase the beam diameter or by changing said potential in a direction toward ground potential to decrease the beam diameter.

4,013,892

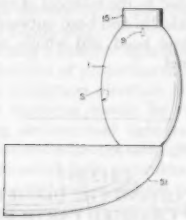
IR GENERATOR HAVING ELLIPSOIDAL AND PARABOLOIDAL REFLECTORS

John Charles Udart, Byron, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed Jan. 29, 1973, Ser. No. 327,692

Int. Cl.² G01J 1/00

U.S. Cl. 250—504 **4 Claims**



1. In an IR generator, the combination of a first shell having an inner reflective ellipsoidal surface dand a second shell having an inner reflective paraboloidal surface;

said shells being secured together with said surfaces' respective major and principal axes transverse to each other;

said first shell being adapted for providing a source of radiation at one focus of said ellipsoidal surface and said shells having openings where they are secured together, for allowing said radiation to enter said second shell via the other focus of said ellipsoidal surface;

said paraboloidal surface being a semiparaboloid, one side of which has a flat plate having one of said openings therein.

4,013,893

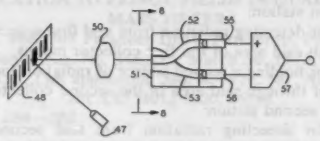
OPTICAL BAR CODE SCANNING DEVICE

Urs W. Hertig, Auburn, N.Y., assignor to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,587

Int. Cl.² G06K 7/10

U.S. Cl. 250—568 **9 Claims**



1. In an optical bar code scanning device for high data density bar code reading, the bar code comprising a plurality of bar code elements: means for illuminating the bar code to be read so that light is reflected therefrom, a pair of photodetectors, means for gathering the reflected light so that it falls on the photodetectors, said photodetectors being arranged in the device so that one of them can receive no more reflected light than would be received from a code bar that is twice the width of the smallest bar code element, the other of said photodetectors being arranged so that it receives less reflected light by a predetermined amount than is received by said first mentioned photodetector, and means for comparing the outputs of the two photodetectors.

4,013,894

SECURE PROPERTY DOCUMENT AND SYSTEM

Francis C. Foote, Rocky River, and Charles K. Beck, Mentor, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed May 27, 1975, Ser. No. 581,351

Int. Cl.² G06K 19/08

U.S. Cl. 250—569 **35 Claims**

1. A secure property for an article in a group of authentic articles for preventing certain alterations or duplication of the article, said secure property comprising:

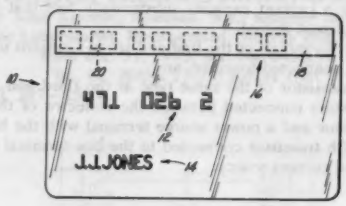
at least two sets of data carried by said article, each said data set containing at least one data element which has a spacial relationship to at least one data element of the other data set,

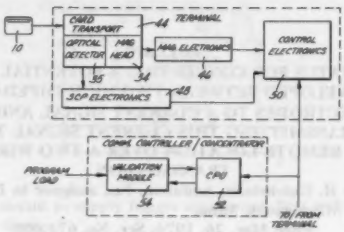
one of said data sets containing informational data to be rendered secure by said secure property and being substantially different than the data of said other data set,

said spacial relationship between said data set elements being substantially unique to said article within said group of authentic articles whereby the authenticity of said article may be determined,

one of said data sets comprising means including a plurality of radiant energy modifying elements for providing data in the form of detectable radiant energy signals in response to irradiation with radiant energy of appropriate characteristics, the other of said data sets comprising

magnetic data including a plurality of magnetic flux changes at least some of which are randomly spaced





within limits from at least some of said radiant energy modifying elements.

4,013,895

CLAMPING TOOL AND METHOD

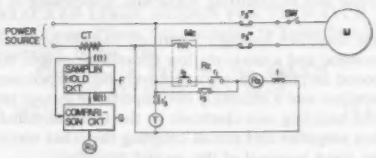
Toshio Akiyoshi, and Hakushi Shibuya, both of Kukuoka, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 28, 1973, Ser. No. 392,372

Claims priority, application Japan, Aug. 28, 1972, 47-100247[U]; Dec. 16, 1972, 47-126485; Dec. 23, 1972, 48-2904

Int. Cl.² F16D *17/00*

U.S. Cl. 307—126 **9 Claims**



1. In a motor-type clamping tool of the type having a motor as a driving power source for said clamping tool and circuit means for supplying electric power to energize said motor, the improvement characterized by,

first means connected to said motor for providing a first electrical signal output in response to the differential coefficient of one of the quantities of motor load current, motor applied voltage, motor applied electrical power, and motor rotational rate reaching a predetermined value, said predetermined value being substantially at zero,

second means connected to said motor for providing an electrical switching operation in response to said one quantity reaching a second predetermined value, and

third means responsive to the coincident occurrence of said first electrical signal and said electrical switching operation for cutting off the supply of electric power to said motor.

4,013,896

HIGH-SPEED LOGIC GATE WITH TWO COMPLEMENTARY TRANSISTORS AND SATURABLE RESISTORS

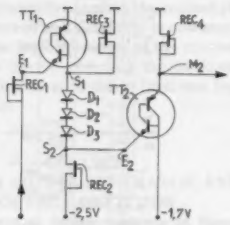
Jean-Edgar Picquendar, and Pham Ngu Tung, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Oct. 15, 1975, Ser. No. 622,611

Claims priority, application France, Oct. 18, 1974, 74.35145

Int. Cl.² H03K *19/08, 19/40, 19/34*

U.S. Cl. 307—214 **6 Claims**



1. A logic gate comprising: first and second solid state components, each component comprising first and second complementary transistors integrated upon one and the same substrate and having respective emitters, bases and collectors, the first transistor having for its base a portion of the collector of said second transistor, and for its collector, the base of said second transistor, said second transistor having its base diffused into its collector, and its emitter into its base, said components having each a first, a second and a third terminal, connected respectively to the emitter of said first transistor, to the base of said second transistor and to the emitter of said second transistor, said first terminals having first connections to ground, said second terminal of said first component having a second connection to ground, and a fixed voltage dropper for connection to the second terminal of said second component, means for connecting a two level voltage to said third terminal of said first component, and second and third connections for connecting to fixed d.c. voltages said second and said third terminal of said second component.

4,013,897

INFORMATION SIGNAL TRANSFER METHOD AND A CHARGE TRANSFER

Yoshiaki Kamigaki, Kokubunji; Hideo Sunami, and Yokichi Itoh, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 304,922, Nov. 9, 1972, abandoned. This application Nov. 1, 1974, Ser. No. 520,095

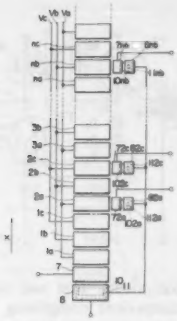
Claims priority, application Japan, Nov. 12, 1971, 46-89938

Int. Cl.² G11C *19/28*; H01L *29/78*

U.S. Cl. 307—221 D **4 Claims**

1. In a charge transfer device for the transfer of charge carriers representing signal information along a semiconductor substrate between signal input means for introducing such charge carriers into said substrate and an output means for detecting said charge carriers, including an insulating layer disposed on the surface of the substrate between the signal input means and the output means, charge carrier transfer means for transferring charge carrier introduced into said substrate by said input means, said charge carrier transfer means including a plurality of spaced electrodes disposed on said insulating layer and means connected to the electrodes for providing voltages to the electrodes for transferring charge carriers introduced into the substrate, said semiconductor substrate consisting entirely of semiconductive material of one type of conductivity adjacent said spaced electrodes, the improvement comprising signal means connected to said input means to provide an information signal to said input means,

said input means functioning to introduce into said substrate a set of substantially equal first and second signals of charge carriers representing said information signal, said first signal being introduced into said substrate before said second signal, said output means functioning to detect said introduced second signal as information, said input means including at least first and second charge carrier injection electrodes connected to receive the information signal from said signal means, said first and second charge carrier injection electrodes being sequentially mounted in line upon said semiconductor substrate in relative spaced relationship and in spaced relationship to said output, said first charge carrier injection electrode being disposed adjacent one of the electrodes of said charge carrier transfer means and said second charge carrier injection electrode being disposed adjacent one of the other electrodes of said charge carrier transfer means disposed between said one of the electrodes of said charge carrier transfer means and said output means, said signal means being arranged to operate so as to simultaneously provide said signal information to said first and second charge carrier injection electrodes.

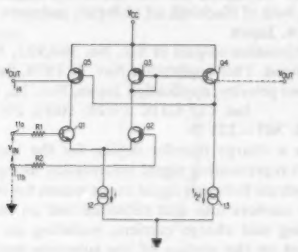


4,013,898

HYSTERESIS CIRCUIT

Shinichi Makino, Fujisawa, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Jan. 14, 1976, Ser. No. 649,042
Claims priority, application Japan, Jan. 17, 1975, 50-7088
Int. Cl.² H03K *5/20*
U.S. Cl. 307—235 F **5 Claims**



1. A hysteresis circuit comprising

a differential amplifier including first and second transistors,

a first input terminal connected via a resistor to the base of the first transistor,

a second input terminal connected to the base of the second transistor,

the emitters of the first and second transistors being connected to one terminal of a first current source,

a current mirror circuit comprising third and fourth transistors of a complementary type to the first and second transistors connected between the collector of the second transistor and one terminal of a second current source having a current capacity substantially half that of the first current source,

the other terminals of the first and second current sources being connected together, and

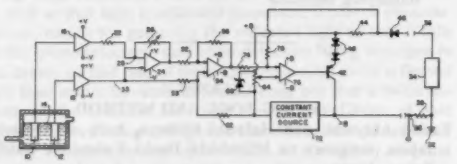
a fifth transistor of the same type as the third and fourth transistors connected between the collector of the first transistor and a power source terminal with the base of the fifth transistor connected to the one terminal of the second current source.

4,013,899

APPARATUS FOR CONVERTING A POTENTIAL SIGNAL DEVELOPED BETWEEN TWO HIGH IMPEDANCE ELECTRODES TO A CURRENT SIGNAL AND FOR TRANSMITTING THIS CURRENT SIGNAL TO A REMOTE LOCATION OVER A TWO WIRE TRANSMISSION

Eugene H. Guicheteau, Audubon, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 26, 1976, Ser. No. 671,000
Int. Cl.² H03K *17/00*
U.S. Cl. 307—235 F **4 Claims**



1. Apparatus for converting a potential difference signal developed between two electrodes which have a high internal impedance to a current signal and for transmitting this current signal to a remote location over a two-wire transmission line which has in series a power supply, one side of which is coupled to a ground reference potential to provide power for the converting and transmitting apparatus, comprising in combination:

a first amplifier having a relatively high impedance input terminal and a relatively low impedance output terminal;

a second amplifier having a relatively high impedance input terminal and a relatively low impedance output terminal;

means coupling one electrode to the input terminal of the first amplifier and means coupling the other electrode to the input terminal of the second amplifier;

differential amplifying means including a pair of input terminals and an output terminal for producing a signal at said output terminal whose magnitude is a function of the difference between the signals coupled to said input terminals;

means for coupling the output of said first amplifier to one of said input terminals;

means for coupling the output of said second amplifier to the other of said pair of input terminals;

means including a constant current source coupling said two-wire transmission line to said other of said input terminals in order to reference the signal at said output terminal of said difference amplifying means to ground potential of said power supply and to establish the signal at said output terminal within a predetermined range; and

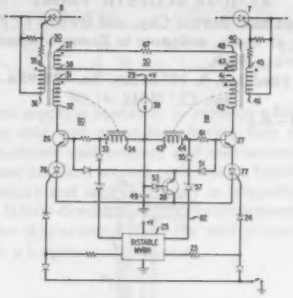
means including a feedback impedance in said two-wire transmission line for controlling the flow of current in said transmission line as a function of the signal level at the output terminal of said difference amplifying means.

4,013,900

CROSS INHIBIT CIRCUIT TO PREVENT MISFIRES OF ALTERNATELY TRIGGERED SWITCHING DEVICES

Robert John Kakalec, Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 31, 1975, Ser. No. 645,894
Int. Cl.² H03K 17/72; H02M 1/08
U.S. Cl. 307—252 K 4 Claims



1. In a circuit to supply trigger signals to a first and second switching device,

first means for triggering said first switching device including a first magnetic apparatus,

second means for triggering said second switching device including a second magnetic apparatus,

cross inhibit means for inhibiting triggering of said first and second switching devices by spurious trigger signals comprising a first winding coupled to said first magnetic apparatus,

a second winding coupled to said second magnetic apparatus,

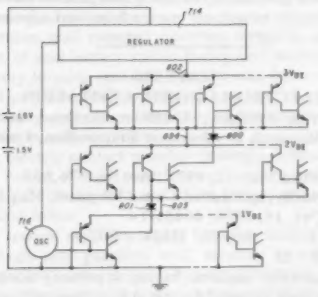
a high impedance electrical path connecting said first and second windings so that a positive signal in one of said magnetic apparatus causes a negative signal in another of said magnetic apparatus and said high impedance is sufficient to attenuate signals due to stored energy inside said magnetic apparatus below a trigger threshold level.

4,013,901

STACKED LOGIC DESIGN FOR I²L WATCH

Clark R. Williams, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 19, 1974, Ser. No. 443,535
Int. Cl.² H03K 1/02, 19/08
U.S. Cl. 307—296 14 Claims



1. A digital system in the form of a monolithic semiconductor integrated circuit which is energizable from a single power source of predetermined magnitude connected between first and second terminals thereof, said system comprised of:

a. first and second logic levels each having at least one logic input and at least one logic output, each of said logic levels being comprised of a plurality of interconnected logic elements with each of said logic elements being comprised of semiconductor devices and having first and second power electrodes for energization thereof;

b. first means coupling the first power electrodes of the logic elements of said first level in common to said first terminal;

c. second means electrically coupling the second power electrodes of the logic elements of said second level in common to said second terminal;

d. third means electrically coupling the second electrodes of the logic elements of said first level in common to the first electrodes of the logic elements of the second level; and

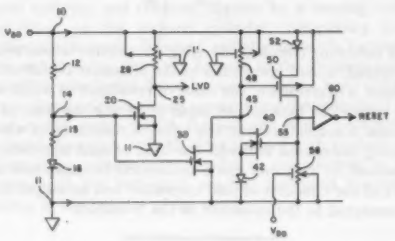
e. a PN junction device coupling the at least one logic output of said first level to the at least one logic input of said second level.

4,013,902

INITIAL RESET SIGNAL GENERATOR AND LOW VOLTAGE DETECTOR

Robert L. Payne, Crystal, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 6, 1975, Ser. No. 602,171
Int. Cl.² H03K 21/32, 17/20, 17/30, 17/60
U.S. Cl. 307—268 7 Claims



1. An apparatus for generating a power up initial reset signal, said apparatus comprising:

first and second input terminals for connection to a source of electric potential;

a first current path between said first and second input terminals formed by a first resistor connected between said first input terminal and a first junction node and a first MOS field effect transistor of a first channel polarity having its drain connected to said first junction node and having its source connected through a first diode to said second input terminal;

a second current path between said first and second input terminals formed by a second resistor connected between said second input terminal and a second junction node and a second MOS field effect transistor of a second channel polarity having its drain connected to said second junction node and having its source connected through a second diode to said first input terminal;

means connecting the gate of said first field effect transistor to said second junction node;

means connecting the gate of said second field effect transistor to said first junction node; and

a third MOS field effect transistor of a first channel polarity having its drain connected to said first junction node, its source connected to said second input terminal, and its gate connected through an impedance to said first input terminal, whereby upon application of a voltage signal between said first and second input terminals, the voltage appearing at said second node in said second current path is first near the potential of said second input terminal, but upon conduction of said third field effect transistor is

switched so as to be near the potential of said first input terminal.

4,013,903

HIGH SPEED SWITCHING CIRCUIT WHICH REDUCES EFFECT OF MINOR CARRIER STORAGE AND PREVENTS UNDESIRED OSCILLATION

Jyunji Sakamoto; Norio Imaizumi, and Eisuke Shiratani, all of Gunma, Japan, assignors to Tokyo Sanyo Electric Co., Ltd. and Sanyo Electric Co., Ltd., Osaka, both of, Japan

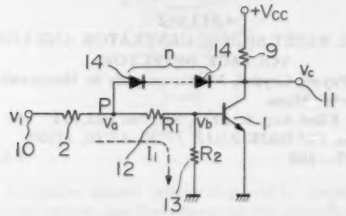
Filed Dec. 6, 1974, Ser. No. 530,285

Claims priority, application Japan, Dec. 7, 1973, 48-143188[U]

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 6, 1976

Int. Cl.² H03K *3/33, 5/08*

U.S. Cl. 307—300 **3 Claims**



1. A switching circuit comprising a transistor whose emitter is grounded, a load connected in the collector circuit of said transistor, a first resistor, the value of resistance of which is R_1, being connected between an input point and the base of said transistor, a second resistor, the value of resistance of which is R_2, being connected between the base of said transistor and the ground, at least one diode connected between said input point and the collector of said transistor, and an output terminal connected to the collector of the transistor.

4,013,904

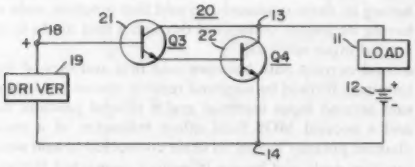
DARLINGTON TRANSISTOR SWITCHING CIRCUIT FOR REACTIVE LOAD

Raymond F. Chick, Greensburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 28, 1975, Ser. No. 608,479

Int. Cl.² H03K *3/26, 17/56, 19/08*

U.S. Cl. 307—315 **10 Claims**



1. A transistorized switching circuit for a reactive load, comprising an input transistor and an output transistor, each said transistor having a base, emitter, and collector electrodes, said input transistor being directly electrically coupled at its emitter electrode to the base electrode of the output transistor, means for connecting a predetermined switching voltage to the base and emitter electrode of the input transistor, means for connecting electrically a reactive load in series with a supply voltage source across the collector and emitter electrode of the output transistor, said input transistor structured to have a collector-emitter sustaining voltage substantially less than the collector-emitter sustaining voltage of the output transistor said sustaining voltages being of sufficient difference that the input transistor collector-emitter clamps any reactive load voltage to the sustaining voltage of the input transistor and prevents power dissipation at the sustaining voltage of the output transistor, and the sustaining voltage of the output transistor is the disconnected common connection of the input and output transistor collectors.

4,013,905

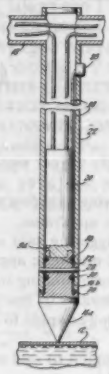
REMOTE ACOUSTIC PROBE

Richard Breneman, Benton City, and Dwight L. Parry, Richland, both of Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed Jan. 9, 1974, Ser. No. 431,954

Int. Cl.² H01L *41/08*

U.S. Cl. 310—8.3 **10 Claims**



1. An apparatus for sensing acoustic emissions from a member under stress comprising:

a. an elongated tubular body;

b. a hard metallic pointed member disposed at one end of said body for receiving and transmitting said acoustic emissions from said member when in firm and direct contact therewith;

c. acoustic transducer means in said body acoustically coupled to said pointed member for receiving said acoustic emissions through said pointed member from said member under stress when said pointed member is in direct contact therewith and converting said emissions into electrical voltages proportional to the amplitude of the emissions received; and

d. means for acoustically isolating said pointed member and said acoustic transducer means from said tubular body.

4,013,906

ELECTROMAGNETIC LEVITATION

John Frederick Eastham, Aberdeen, Scotland, assignor to National Research Development Corporation, London, England

Filed May 12, 1975, Ser. No. 576,663

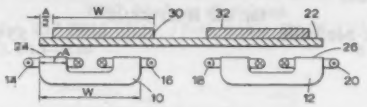
Claims priority, application United Kingdom, May 14, 1974, 21256/74; Oct. 19, 1974, 46481/74

Int. Cl.² H02K *41/02*

U.S. Cl. 310—13 **7 Claims**

1. An electrical machine having a primary comprising a core of magnetic material having at least two pairs of rows of pole faces disposed in a common plane and arranged to provide paths for working flux between the pole faces of each row in planes substantially perpendicular to said rows, and a secondary confronting said pole faces and comprising electrically conductive material arranged to provide longitudinal paths for

electric current on each side of each row of pole faces and transverse paths interconnecting said longitudinal paths and at least one core member of magnetic material extending longitudinally of the electrically conductive material on the opposite side thereof to the primary and having its lateral edges so disposed relative to the primary that the magnetic field produced when the primary is energised from a polyphase alter-



nating current supply is operative to produce a force between said primary and said secondary having first components tending to maintain said primary and said secondary spaced apart from one another, second components tending to maintain said primary and said secondary in alignment with one another in a lateral direction and third components tending to cause relative displacement between said primary and said secondary in a longitudinal direction.

4,013,907

BATTERY POWERED MOTOR ASSEMBLY

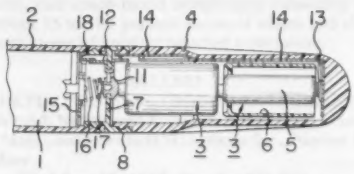
Kenichi Mabuchi, Tokyo, Japan, assignor to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed June 30, 1975, Ser. No. 591,448

Claims priority, application Japan, July 2, 1974, 49-76073

Int. Cl.² H02K 7/14

U.S. Cl. 310—50 **6 Claims**



1. A battery-powered motor assembly comprising; and electric motor;

a motor casing to fixedly retain the motor;

a battery casing to retain at least one battery therein and axially aligned to said motor casing;

a circuit switch which is turned on and off by the relative rotation of said motor and battery casing to energize and deenergize said motor;

a partition wall member covering airtightly an open end face of said battery casing facing said motor casing;

a battery housing space defined by said battery casing and said partition wall member;

a motor housing space defined by said motor casing and said partition wall member;

a first electric contact member sealingly extending through the center of said partition wall member to electrically engage with one terminal of the battery and one terminal of said motor;

and a second electric contact member sealingly extending through said partition wall member spaced from the center thereof to electrically engage with the other terminal of the battery and the other terminal of said motor;

said battery housing space and said motor housing space being separated by said partition wall member; and

an intermediate casing coaxially fitted to said motor and battery casings, said intermediate casing carrying said partition wall member.

4,013,908

COOLING SYSTEM FOR A SUPERCONDUCTIVE EXCITER WINDING

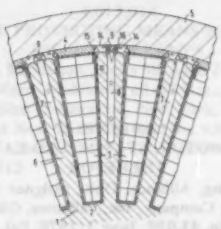
Erich Weghaupt, Mulheim (Ruhr), Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed June 2, 1975, Ser. No. 583,159

Claims priority, application Germany, Mar. 13, 1975, 2511104

Int. Cl.² H02K 1/20

U.S. Cl. 310—61 **4 Claims**



1. Cooling system for a superconductive exciter winding in a turbogenerator rotor, the exciter winding having winding coils formed of a multiplicity of individual windings that are received in slots formed at the outer periphery of a solid support cylinder and retained therein by a bracing cylinder shrink-fitted on the support cylinder, comprising coolant distribution channels disposed radially in teeth located between and defining the slots formed in the support cylinder and in filler members located between winding head coils, said coolant distribution channels surrounding the individual windings over the entire length thereof and being connected in peripheral direction on both sides thereof with coolant channels extending substantially parallel to one another in radial direction with the individual winding coils and surrounding the same at the bottom of the slots.

4,013,909

ELECTRIC MOTORS

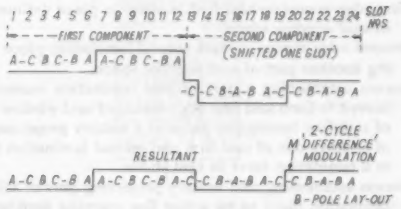
Alexander Richard William Broadway; William Fong, both of Westbury-on-Trym, and Gordon Hindle Rawcliffe, Bristol, all of England, assignors to National Research Development Corporation, England

Continuation of Ser. No. 410,353, Oct. 29, 1973. This application May 6, 1975, Ser. No. 575,044

Claims priority, application United Kingdom, Nov. 3, 1972, 50832/72

Int. Cl.² H02K 3/00

U.S. Cl. 310—180 **4 Claims**


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
SLOT NOS
FIRST COMPONENT
SECOND COMPONENT
(SHIFTED ONE SLOT)
A-C B C-B A A-C B C-B A
-C C B-A-B A-C C B-A-B A
2-CYCLE DIFFERENCE MODULATION
RESULTANT
A-C B C-B A A-C B C-B A-C C B-A-B A-C C B-A-B A
8-POLE LAY-OUT

1. A 3-phase alternating-current, speed-changing electric machine of the pole-amplitude modulation type, having a composite 3-phase stator winding consisting solely of two 3-phase winding components providing alternative first and second pole-numbers, the said two components being combined as said composite stator winding, the first in a first

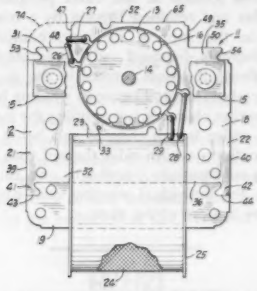
half-perimeter of the machine stator and the second in the second half-perimeter of the machine stator, said composite winding providing alternative pole-numbers respectively equal to double the said first and second pole-numbers of said components.

4,013,910

ELECTRIC MOTOR, STATOR AND LAMINATION THEREFOR

Andrew F. Deming, Alliance, Ohio, assignor to The Alliance Manufacturing Company, Inc., Alliance, Ohio

Division of Ser. No. 43,039, June 3, 1970, Pat. No. 3,694,903.
This application Mar. 15, 1972, Ser. No. 234,704
Int. Cl.² H02K 3/06
U.S. Cl. 310—211 6 Claims



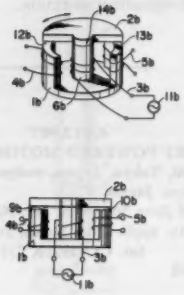
1. An electric motor, comprising in combination,
a laminated stator and a rotor,
a rotor portion and a winding portion on said stator,
an aperture in said rotor portion for said rotor,
leg means on said stator interconnecting said winding and rotor portions and surrounding a window space,
winding means on said winding portion passing through said window space to establish flux in said stator,
first and second complementary pieces of lamination material forming at least part of each of several layers in said laminated stator,
first edge means on said first lamination piece defining part of said window space,
second edge means on said second lamination piece defining another part of said window space,
means establishing a part of said lamination material removed to form said first edge means of said window space of said first lamination piece as a unitary projecting part of another one of said first and second lamination pieces in a lamination layer in said stator,
means establishing said unitary projecting part of said first lamination piece as an active flux carrying member in a layer in said laminated stator,
first and second legs as part of said leg means,
said second leg being unitary with said rotor portion and said winding portion and defining said first lamination piece,
and said first leg being substantially all of said second lamination piece.

4,013,911

DISPLACEMENT - ELECTRICITY TRANSDUCER

Hideo Fujiwara, Tachikawa; Yukio Ichinose, and Kenji Kato, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 21, 1974, Ser. No. 516,806
Claims priority, application Japan, July 22, 1974, 49-83179; July 24, 1974, 49-84182; Oct. 19, 1973, 48-116842
Int. Cl.² H02P 13/10
U.S. Cl. 340—199 53 Claims



1. A displacement-electricity transducer comprising:
a movable magnetic core and a fixed magnetic core which are oppositely arranged so as to have predetermined gaps between at least two oppositely disposed portions of said respective magnetic cores, both said magnetic cores forming substantially two closed magnetic circuits, each circuit including one of said gaps and a common magnetic path portion, said movable magnetic core and said fixed magnetic core being more closely coupled at said common path portion than at said gaps, wherein upon displacement of said movable magnetic core relative to said fixed magnetic core, the area of common projection between opposing portions of said magnetic cores having one of said gaps therebetween in one of said closed magnetic circuits increases, while the area of common projection between opposing portions of said magnetic cores having the other of said gaps therebetween in the other closed magnetic circuit decreases;
a first coil which is wound around the common magnetic path portion of said two closed magnetic circuits;
at least one second coil which is wound around a portion other than said common magnetic path portion in at least one of said closed magnetic circuits; and
an A.C. power source for applying an A.C. voltage to said first coil.

4,013,912
GAS MIXTURE FOR GLOW DISCHARGE DEVICE

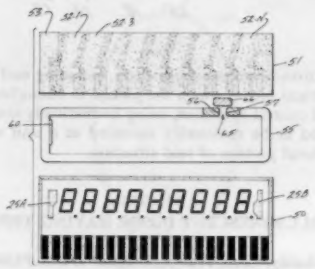
David C. Hinson, Whitehouse, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 412,576, Nov. 5, 1973, Pat. No. 3,904,915, which is a continuation-in-part of Ser. No. 279,875, Aug. 11, 1972, Pat. No. 3,886,393. This application Apr. 14, 1975, Ser. No. 567,793

The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.

Int. Cl.² H01J *17/20, 17/48, 63/04;* H05B *33/10*

U.S. Cl. 313—226 8 Claims



1. In a process for operating a cathode glow gas discharge information display device which comprises a matrix of gas discharge cells, each having at least one cathode electrode element having a configuration defining the glow discharge portion of the display, and an ionizable gaseous medium, the improvement which comprises decreasing the device operating currents by operating the device with an ionizable gaseous medium consisting essentially of about 20 to 35 percent atoms of argon and about 80 to 65 percent atoms of a xenon-based composition, said xenon-based composition consisting essentially of about 95 to 100 percent atoms of xenon and about 5 to 0 percent atoms of another selected component.

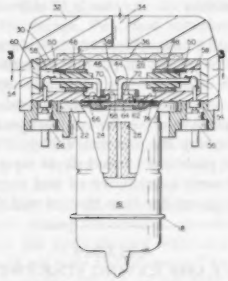
4,013,913
ION DETECTION ELECTRODE ARRANGEMENT

John N. Driscoll, Natick, and Frederick F. Spaziani, Lexington, both of Mass., assignors to HNU Systems Inc., Newton Upper Falls, Mass.

Filed Jan. 19, 1976, Ser. No. 650,531

Int. Cl.² H01J *1/52*

U.S. Cl. 313—242 21 Claims



1. An electrode arrangement for detecting ionized species in apparatus comprising a radiation source for ionizing said species and detection electrodes comprising an anode and a cathode, said arrangement comprising:

said cathode having an annular configuration defining an annulus extending in a transverse plane across the axis of radiant energy emission from said radiation source;

said anode having a distal end positioned centrally of said cathode annulus in the path of radiant energy emission from said radiation source; and

a shield opaque to said radiant energy extending between said cathode and said radiation source, said shield having an aperture therethrough aligned with said cathode annulus and defining a wall of said shield spaced radially inwardly from said cathode annulus, said anode thereby adapted for direct exposure to said radiant energy through said aperture and said cathode shielded from said radiant energy by said shield.

4,013,914
ELECTRODE PROTECTING MEANS FOR ELECTRIC DISCHARGE LAMPS

James P. Clune, Middleton; Harry W. Aptt, Jr., Gloucester, and Sebastian J. Marci, Middleton, all of Mass., assignors to North American Philips Corporation, New York, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,418

Int. Cl.² H01J *1/52, 19/40*

U.S. Cl. 313—313 2 Claims

1. A discharge tube comprising two electrodes, at least one wire probe electrically connected to each electrode and mounted in proximity thereto to act as a collector of electrons during a positive half-cycle on an electrode and, on each wire probe, a coating of a dielectric material having very low electron leakage to store some of the collected electrons and to attract during a negative half-cycle a part of positive ions impinging upon the electrode.

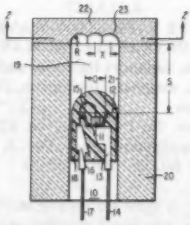
4,013,915
LIGHT EMITTING DEVICE MOUNTING ARRANGEMENT

William Henry Dufft, Shillington, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 23, 1975, Ser. No. 625,022

Int. Cl.² H05B *33/02*

U.S. Cl. 313—499 6 Claims



1. An optical device comprising:

a solid state light-emitting device;

a body of material defining a cavity with side walls and an opening at the top within which cavity is mounted said light-emitting device, the walls of said cavity forming spectrally reflective surfaces; and

a filter element having top and bottom surfaces formed over

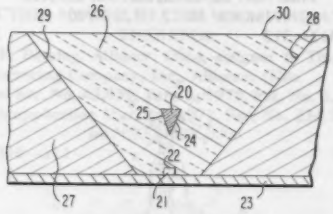
the opening in said cavity with the top surface facing away from the cavity and the bottom surface facing the cavity wherein said top surface is flat and said bottom surface includes a plurality of spherical surfaces formed therein in the area over said cavity with the concave side of the surfaces facing said cavity such that a plurality of images of said light-emitting device is formed by said surfaces.

4,013,916

SEGMENTED LIGHT EMITTING DIODE DEFLECTOR SEGMENT

Raymond E. Brown, Los Gatos, Calif., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 3, 1975, Ser. No. 619,432
Int. Cl.² H01J *1/62*
U.S. Cl. 313—510 **12 Claims**



1. A method of controlling the distribution of light along the surface of an electroluminescent semiconductor display segment, where said segment is comprised of a base, a body of reflector material having an upper and lower surface and an aperture therebetween, said lower surface connected to said base in a light-tight manner, said aperture having reflective sides and a central axis,, an electroluminescent semiconductor attached to said base essentially centrally lcoated in said aperture, said semiconductor having a generally Lambertian pattern of light emission upward from said base the rest of said aperture being substantially occupied by a solid translucent medium from said lower surface to substantially said upper surface forming a viewing surface, said method comprising the step of:

introducing a deflector body into said translucent medium into said Lambertian pattern of light emission such that light emitted by said semiconductor upon striking said deflector is controllably reflected towards the reflective sides of said aperture and thence to said viewing surface to produce along said viewing surface a distribution of light different from said Lambertian pattern.

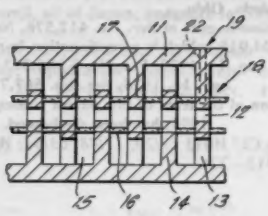
4,013,917

COUPLED CAVITY TYPE SLOW-WAVE STRUCTURE FOR USE IN TRAVELLING-WAVE TUBE

Toshinori Horigome; Sadanori Hamada, and Takami Sato, all of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,734
Claims priority, application Japan, Dec. 3, 1974, 49-139088
Int. Cl.² H01J *25/34*
U.S. Cl. 315—3.5 **4 Claims**

1. A coupled cavity type slow-wave structure for use in a travelling-wave tube, wherein a plurality of partition walls are arranged at a given spacing within a circular waveguide to define a plurality of cavities, each partition wall serving as the common wall between adjoining cavities and provided with central apertures which are axially aligned to permit passage of electron beams therethrough, and coupling slots communicating the adjoining cavities with each other; characterized by being further comprised of dielectric cylindrical spacers each having an inner diameter larger than the diameter of said central apertures and axially aligned with said central apertures between each pair of said partition walls, said dielectric cylindrical spacers being brazed to said partition walls;



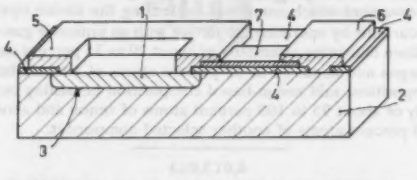
said electron-beam passing portion, including said dielectric cylindrical pieces which are placed in encircling relation to said central apertures, being hermetically sealed and is adapted to be removably mounted as a unit within the peripheral portion of said structure.

4,013,918

ELECTROLUMINESCENT DIODE HAVING THRESHOLD EFFECT

Jacques Lebailly, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 2, 1974, Ser. No. 485,225
Claims priority, application France, July 3, 1973, 73.24412
Int. Cl.² H01L *27/15, 33/00;* **H05B** *33/14*
U.S. Cl. 315—71 **16 Claims**



1. A monolithic electroluminescent semiconductor device comprising:

a. a monocrystalline semiconductor body having a major surface;

b. a semiconductor zone which extends along a part of said major surface of said semiconductor body, said zone adjoining a portion of the semiconductor body and forming therewith a diode that can emit radiation, said diode having a junction which extends to at least said surface of said semiconductor body;

c. a current path element disposed at said major surface and connected electrically in parallel with said junction, said current path element being physically separate from said semiconductor zone and said semiconductor body portion and leaving said junction at least partly intact at said surface, whereby the current voltage characteristics of said current path and of said diode intersect each other and the dynamic admittance of said current path at the intersection is smaller than that of said diode.

4,013,919

DISCHARGE LAMP HAVING FUSE-SWITCH GUARD AGAINST JACKET FAILURE

Eugene K. Corbley, Cleveland Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 4, 1975, Ser. No. 601,858
Int. Cl.² H05B *41/231;* **H01J** *7/44*
U.S. Cl. 315—73 **5 Claims**

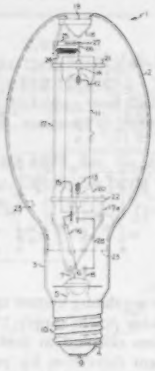
1. A jacketed electric lamp comprising a vitreous outer envelope having inleads sealed therethrough;

a vacuum or a nonoxidizing filling in said outer envelope;

an inner envelope of material which transmits ultraviolet radiation within said outer envelope;

said inner envelope having electrodes sealed into its ends and containing an ionizable medium comprising a metal which produces radiation including ultraviolet which is transmitted by the inner envelope and normally intercepted at the outer envelope;

and means connecting the electrodes of the inner envelope to the inleads of the outer envelope, said means including a fuse-switch comprising a resistive heater connected in series circuit with the inner envelope and made of a metal



that oxidizes rapidly upon contact with air at the temperature caused by normal lamp current flow through it, and a thermal switch shunting said heater and located in heat-receiving relationship from said heater and from said inner envelope, said switch being normally open when the lamp is off but closing upon heating by said heater, and thereafter being held closed by heat from said inner envelope when the lamp is operating normally but cooling and reopening upon air contact should the outer envelope be broken, whereupon said heater carries lamp current and oxidizes rapidly, culminating in burn through of said heater and permanent disablement of the lamp.

4,013,920

SAFETY SWITCH WHICH RENDERS HID LAMP INOPERATIVE ON ACCIDENTAL BREAKAGE OF OUTER ENVELOPE

John Petro, Belleville, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

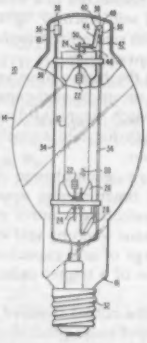
Filed Jan. 22, 1976, Ser. No. 651,306

Int. Cl.[2] H01J *7/44, 13/46, 17/34;* **H01K** *1/62*

U.S. Cl. 315—73 **5 Claims**

1. In combination with a high-intensity discharge lamp comprising an elongated radiation-transmitting arc tube which is longitudinally disposed and supported within an elongated light-transmitting protective envelope having a neck portion and a dome portion and which is opaque to short wavelength ultraviolet radiations, said arc tube enclosing a discharge-sustaining filling and having electrodes operatively positioned therein proximate the ends thereof, electrical lead-in means sealed through said arc tube and connected to said electrodes, electrical adaptor means affixed to the neck portion of said envelope to facilitate electrical connection of said lamp to a source of electrical power, electrical conductor means electrically connecting said electrical adaptor means to said electrical lead-in means, said electrical conductor means including an arc tube supporting frame comprising elongated rigid metallic supporting members longitudinally disposed within said protective envelope and having extremity portions proximate the dome portion of said protective envelope, and flexible leaf-spring metallic members affixed proximate the extremity portions of said rigid metallic supporting members and laterally extending therefrom with the extremity portions of said leaf-spring members urged toward the inner surface of said dome portion of said protective envelope by the resiliency of said leaf-spring members to provide a lateral and somewhat resilient support for said arc tube, the improvement which comprises:

switch means having a normal closed position in which said switch means is electrically conducting and an open position in which said switch means is electrically non-conducting, said switch means included in series circuit arrangement intermediate said arc tube supporting frame and one of said electrical lead-in means, said switch



means including a mechanically actuated contact member comprising a resilient elongated body having one end affixed to said one of said electrical lead-in means, and the other end of said resilient elongated body being movable and urged by its resiliency toward the inner surface of said dome portion of said protective envelope and in electrical contact with one of said leaf-spring metallic members to maintain said switch means in said closed position, and breakage of said protective envelope permitting said resilient elongated body and said leaf-spring support member which normally contacts said resilient elongated body to be moved by their resiliencies out of electrical contact with each other, thereby to render said lamp inoperative.

4,013,921

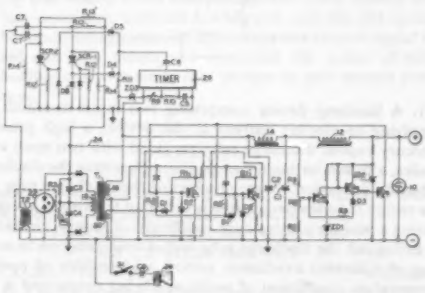
WARNING LIGHT CONTROL

William I. Corthell, East Haddam, Conn., assignor to Austin Electronics, Inc., Deep River, Conn.

Filed June 2, 1975, Ser. No. 582,654

Int. Cl.[2] H05B *37/00, 39/00, 41/14*

U.S. Cl. 315—241 R **8 Claims**



1. Apparatus for controlling the energization of a warning light, the warning light including a gaseous discharge lamp with a trigger pulse transformer coupled thereto, said energization control apparatus comprising:

timer means, said timer means including a square wave generator and producing an output signal having two states, the square wave generator having an adjustable duty cycle;

static inverter means adapted to be supplied from a low voltage direct current source, said inverter means including an oscillator which generates an alternating voltage at a frequency greater than the frequency of said timer means square wave generator output signal, the output of said inverter means being a high DC voltage;

means coupling the high DC voltage produced by said static inverter means to said warning light gaseous discharge lamp;

capacitor means connected to a winding of the trigger pulse transformer of said warning light, said capacitor means cooperating with said pulse transformer winding to define a series resonant circuit;

means delivering the high output voltage produced by said static inverter means to said capacitor means;

normally open switch means, said switch means establishing a discharge path for said capacitor means when in the closed condition;

means responsive to each change in the level of the output signal of said timer means square wave generator for producing a switching control pulse for application to said switch means whereby said switch means is closed to permit discharge of said capacitor means with the resultant generation of a trigger pulse in said series resonant circuit;

means coupling the output signal of said timer means to said switching control pulse producing means; and

means for delivering switching control pulses provided by said switching control pulse producing means to said normally open switch means.

4,013,922

SUNLAMP DEVICE

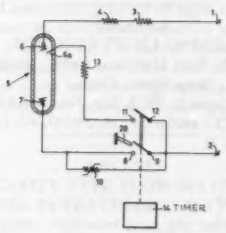
Andries van der Meulen, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 10, 1975, Ser. No. 594,589

Claims priority, application Netherlands, Aug. 1, 1974, 7410336

Int. Cl.² H05B *41/19, 41/36*

U.S. Cl. 315—362 **13 Claims**



1. A Sunlamp device comprising two input terminals for supplying an electric current to the device, a high pressure mercury vapour discharge tube provided with two main electrodes, a switch having a first position for setting the discharge tube into operation, means connecting the discharge tube and the switch in series circuit across the input terminals, a resistor having a positive temperature coefficient of resistance thereby to extinguish the discharge tube with a time delay on termination of a desired irradiation period, said resistor of positive temperature coefficient of resistance being connected in circuit so that in the first position of the switch it carries substantially no current and in a second position of said switch said resistor is in series with the discharge tube across the input terminals of the device, and means for preventing the discharge tube from restriking after extinction thereof by maintaining the voltage between the main electrodes of the discharge tube at a low voltage different from zero.

4,013,923

HIGH VOLTAGE REGULATION SYSTEM

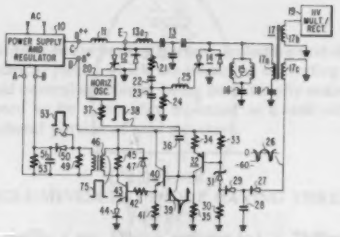
Willem den Hollander, Schlieren, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,967

Claims priority, application United Kingdom, Sept. 2, 1975, 36089/75

Int. Cl.² H01J *29/70*

U.S. Cl. 315—411 **5 Claims**



1. A high voltage regulating system comprising:

a switching regulator power supply;

a deflection system coupled to said supply for receiving operating current therefrom for producing periodic retrace voltage pulses suitable for rectification for providing an ultor potential for a cathode ray tube;

a source of sync pulses coupled to said deflection system for synchronizing said periodic pulses; and

power supply control means coupled to a source of periodic voltage waveforms in said deflection system, said source of sync pulses and said power supply, said control means including:

a differentiating network for differentiating said sync pulses;

a transistor stage coupled to said differentiating network for receiving differentiated pulses therefrom;

means for developing a first control signal representative of the level of said periodic waveforms and applying said first control signal to said transistor stage to control the bias thereon for controlling the width of said differentiated sync pulses obtained from said transistor stage; and

means for developing a second control signal from said width-modulated sync pulses and for coupling said second control signal to said switching power supply for controlling the duty cycle of said switching.

4,013,924

METHODS AND MEANS FOR DETECTING THE PRESENCE OF MOISTURE ADJACENT INSULATED PIPES

Gunnar Buhl Christensen, and Ove Thastrup, both of Fredericia, Denmark, assignors to A/S E. Rasmussen, Denmark

Filed Mar. 19, 1970, Ser. No. 21,028

Int. Cl.² H02H *7/26*

U.S. Cl. 361—49 **8 Claims**

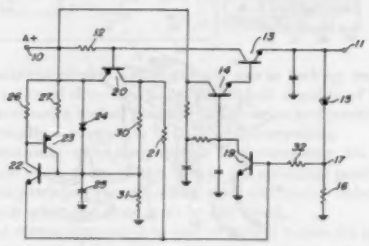
1. A pipe system including a prefabricated conductor ele-

ment for use in a subterranean fluid conductor system comprising a fluid conducting length of pipe surrounded by a dry, hygroscopic insulating foam material of artificial resin enclosed with an outer protective pipe casing of water tight material, at least one electrical wire embedded in said insulating material so as to extend along said pipe and said pipe casing in spaced relationship thereto within the insulating material, the insulating material is surrounded by a moisture tight protective tube bridged tightly by tube casings adjacent the joints between individual pipe lengths, said tube casings being provided with a one way valve in a wall portion thereof, these valves being oriented so as to allow moisture to escape from the interior of said casings.

4,013,925
OVERLOAD PROTECTION CIRCUIT FOR VOLTAGE REGULATOR

Lee Don Tice, Rolling Meadows, and David Michael Drury, Mundelein, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 10, 1975, Ser. No. 630,561
Int. Cl.² H02H 7/20
U.S. Cl. 361—18 **4 Claims**



1. In a voltage supply for providing output to a loading circuit, an overload protection circuit comprising in combination:

an input terminal coupled to a source of DC voltage;

an output terminal coupled to the loading circuit;

a common terminal;

voltage regulating means coupled across the output means and having first diode means and first resistor means connected in series across the output and common terminals, first transistor means having a base-emitter circuit coupled in parallel with the first resistor means, second and third transistor means in a Darlington connection coupled to the output terminal, the first transistor means forming an amplifier coupled to the Darlington-connected transistor means and to the common terminal for providing an output voltage which is substantially the sum of the voltages on the first diode means and the amplifier;

limiting means coupled to the input terminal and to the voltage regulating means and comprising a sensing resistor coupled between the input terminal and the collector of the second transistor means, fourth transistor means having an emitter coupled to the input terminal, a base coupled to the collector of the second transistor means and a collector coupled through a second resistor to the base of the transistor amplifier for causing the fourth transistor to conduct when an excessive current flows through the sensing resistor, thereby shunting the third transistor for maintaining the current in the loading circuit at substantially a predetermined level;

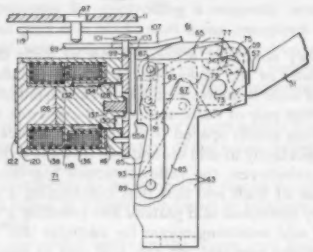
latching means coupled to the input terminal and including fifth and sixth transistor means connected back to back and coupled to the base of the first transistor means, a timing capacitor coupled between the fifth transistor base and the common terminal, third resistor means coupled between the collector of the fourth transistor means and the timing capacitor for charging the capacitor when the fourth transistor is conducting and for causing the fifth and sixth transistor means to conduct when the charge on the timing capacitor reaches a predetermined level, thereby causing the transistor amplifier to become saturated and the second and third transistor means to be cut off; and

delay means comprising a fourth resistor coupled across the timing capacitor for providing a delay in reaching the predetermined level of charge on the timing capacitor, and a second diode means coupled to the timing capacitor and to the latching means for providing a quick discharge path for the capacitor when the DC voltage source is disconnected from the input terminal.

4,013,926
CIRCUIT BREAKER WITH IMPROVED TRIP ACTUATOR AND UNDERVOLTAGE RELEASE MECHANISM

Walter W. Lang, Beaver Falls; John A. Wafer, Monroeville; Walter V. Bratkowski, McKeesport, and Suresh K. Bhate, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 11, 1975, Ser. No. 595,184
Int. Cl.² H02H 3/38
U.S. Cl. 361—115 **10 Claims**



1. A circuit interrupter comprising:

separable contacts;

releasable means operable upon actuation to effect automatic separation of said contacts; and

a release actuator comprising:

a cylindrical plunger operable between first and second positions, said plunger actuating said releasable means when operated to said second position;

means for biasing said plunger toward said second position;

a holding coil coaxially wound about said plunger and operable when energized by a voltage above a predetermined value to oppose the action of said bias means and maintain said plunger in said first position; and

a trip coil wound about said plunger and being coaxial and non-concentric with said holding coil, said trip coil operable upon energization by an overcurrent control signal to aid said bias means and overcome the action of said holding coil to operate said plunger to said second position.

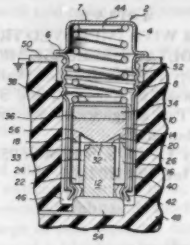
4,013,927
SURGE ARRESTER

Alexander George Gilberts, Algonquin, Ill., assignor to Reliable Electric Company, Franklin Park, Ill.

Filed Sept. 18, 1975, Ser. No. 614,742
Int. Cl.² H02H 1/04, 3/22
U.S. Cl. 361—119 **6 Claims**

1. In a surge arrester for providing overvoltage protection for a communications line or the like and which comprises a housing, a pair of spaced electrodes, insulating means surrounding a first of said electrodes and with a transverse end of said first electrode being recessed within said insulating

means, the second of said electrodes having a part of a transverse end seated on said insulating means and presented toward said first electrode whereby an arc gap is provided that is determined by the extent of the recess of said first electrode within said insulating means, and means for retaining said electrodes and said insulating means in said housing; characterized by said second electrode having valley structure in said transverse end that opens toward said first electrode and with a single plateau only projecting from the floor of said valley structure, the end surface of the plateau being flat and forming one side of the arc gap and being symmetrical relative to the central axis of said second electrode, the valley structure having a first pair of walls that are on opposite sides of said end surface and which slope away therefrom toward the floor



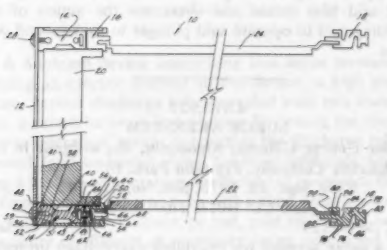
of the valley structure, a second pair of walls that are on opposite sides of and spaced from said end surface, said second pair of walls being respectively circumferentially intermediate the first pair of walls, said second electrode also having opposed flats axially spaced from said end surface and being joined respectively to said second pair of walls to form obtuse angles therebetween, the valley structure together with said second pair of walls and said flats constituting a region that completely surrounds said plateau and provides a vent across an end of said insulating means for particles that erupt from said electrodes into said arc gap, said part of said transverse end comprising spaced ridges which are small as compared to the peripheral extent of said second electrodes such that the vent is unobstructed throughout a major portion of said peripheral extent.

4,013,928

CARD CAGE ASSEMBLY

George A. Sarinopoulos; Robert E. McCarthy, both of Oklahoma City, and Joseph R. Waldrop, Bethany, all of Okla., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Apr. 24, 1974, Ser. No. 463,694
Int. Cl.² H02B 1/02
U.S. Cl. 361—380 **6 Claims**



1. In a card cage assembly having a back panel, side plates, card guides, an elongated rear bar, an elongated clamping bar, electrical connectors having end portions secured to the rear bar and the clamping bar, and an elongated front bar, the front bar and the clamping bar supporting the card guides, the improvement comprising:

a. the rear bar further including a first side portion, a second side portion, a top and bottom portion, and end portions, said first side portion having an extruded channel formed therein and said second side portion having an extruded channel formed therein; and

b. the front bar further including a first side portion, a second side portion, a top and bottom portion, and end portions, said top and bottom portion having extruded channels formed therein; and

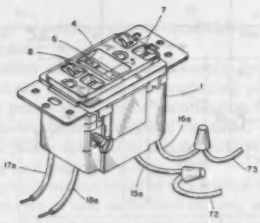
c. thread-forming screw securing means engageable in said channels for constructing the assembly.

4,013,929

MULTIPLE DUTY COMPONENTS OF A GROUND FAULT RECEPTACLE

Robert E. Dietz, Cedar Rapids; Darrell P. Ophaug, Marion, both of Iowa, and Lynn B. Steve, Port Richey, Fla., assignors to Square D Company, Park Ridge, Ill.

Filed Apr. 18, 1975, Ser. No. 569,260
Int. Cl.² H02B 1/04
U.S. Cl. 361—357 **2 Claims**



1. A compact ground fault receptacle assembly for mounting in a common trade size junction box, comprising a unitary case having components mounted internally thereof, including internal socket means in said case for receiving the plug of an electrical applicance, internal conductor means in said case leading from said socket means for connection to an external power source, including said external power source, internal breaker contact means in said case to interrupt said conductor means, internal contact separation means in said case electrically connected to and powered by said external power source, internal sensing means in said case electrically and magnetically connected to said conductor means to detect an abnormal ground condition therein and to produce an electrical signal on detection thereof, internal signal responsive switching means in said case electrically connected to said contact separation means and said external power source to normally prevent application of full voltage of said external power source to said contact separation means thus rendering said separation means normally inoperative, said signal responsive switching means being electrically connected to said sensing means and being responsive upon receipt of an abnormal ground condition signal to cause full voltage of said external power source to be applied to said contact separation means rendering it operative to separate said breaker contacts and interrupt said conductor means, said internal socket means, internal conductor means, internal breaker contact means, internal contact separation means, and internal signal responsive switching means being operably mounted wholly within said case of said compact ground fault receptacle assembly, said internal conductor means includes feed-through terminals leading therefrom on the load side of said internal breaker contact means for ground fault protection of receptacles connected in parallel to said feed-through terminals, said internal contact separation means, said internal sensing means and said internal signal responsive switching means each in-

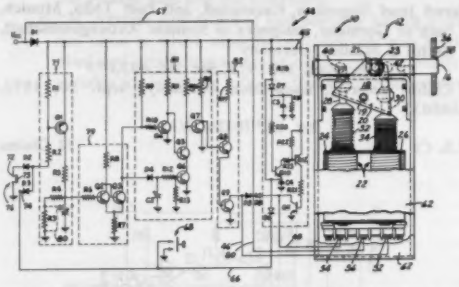
cluding components operably mounted to perform multiple functions enabling incorporation of a complete and improved ground fault interrupting mechanism within the small confines of said case of said compact receptacle assembly.

4,013,930

ELECTRONIC DOOR LOCK

David Geller, Chicago, Ill., assignor to Wico Corporation, Niles, Ill.

Filed Oct. 20, 1975, Ser. No. 624,055
Int. Cl.² E05B *47/02*
U.S. Cl. 361—172 **10 Claims**



1. Electrical control apparatus for use in locking and unlocking a closed door which has a lockbolt capable of being moved between a locked position and an unlocked position by an electrically energizeable bolt mover, comprising:

an electronic unlocking circuit for energizing the bolt mover so as to move the bolt to the unlocked position;

switching means for actuating said electronic unlocking circuit when the door is to be unlocked;

control means responsive to said switching means for generating a control signal time-delayed by at least a predetermined interval after the actuation of said unlocking circuit; and

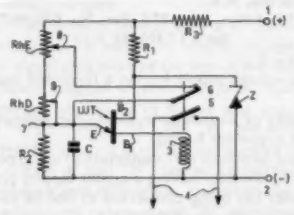
an electronic locking circuit responsive to said time-delayed control signal for energizing the bolt mover only when the door is closed so as to move the lockbolt to the locked position, thereby causing said door, when closed, to be automatically locked after at least said predetermined interval following the unlocking of the door.

4,013,931

VOLTMETRIC SYSTEM COMPRISING AN ELECTROMAGNETIC RELAY

Wladimir de Fligue, 203 rue d'Aulnay, Le Plessis-Robinson (Hauts-de-Seine), and Claude Henri Mottet, 70 rue de la Gare, Ezanville (Val-d'Oise), both of France

Filed July 24, 1975, Ser. No. 598,834
Claims priority, application France, Aug. 7, 1974, 74.27470
Int. Cl.² H01H *47/32*
U.S. Cl. 361—187 **6 Claims**



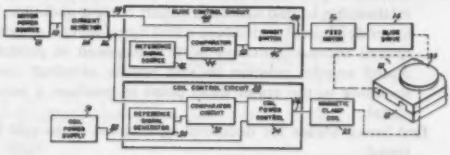
1. A device responsive to a substantially direct voltage source of variable voltage comprising: voltage divider means connected to said source and having an intermediate portion; a unijunction transistor having its emitter connected to the lower voltage end of said intermediate portion; an electromagnetic relay having: a coil connected in series with the bases of said transistor and said source, at least one normally open contact, and one normally closed contact shunting said intermediate portion and voltage stabilizing means shunting the series-connected transistor bases and coil.

4,013,932

APPARATUS FOR CONTROLLING A MAGNETIC CLAMP

Pawan Kumar Aggarwal, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Oct. 6, 1975, Ser. No. 619,654
Int. Cl.² B23Q *5/10*
U.S. Cl. 318—39 **6 Claims**



1. An apparatus for controlling a magnetic work clamp comprised in part of a clamp coil being energized by a coil power supply, said work clamp being contained on a machine tool having a machine slide driven by a feed motor responsive to a motor power source, wherein the improvement comprises:

a. means responsive to the motor power source for generating a first signal as a function of the power being supplied to said feed motor;

b. means connected to the generating means for comparing the first signal to a reference signal to produce a control signal; and

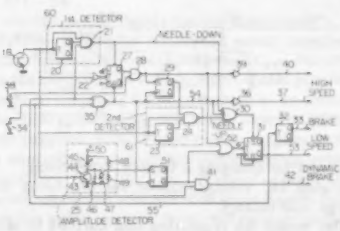
c. means connected between the clamp coil and the coil power supply and responsive to the comparing means for regulating the power applied to the clamp coil as a function of the control signal.

4,013,933

NEEDLE POSITION DETECTOR FOR INDUSTRIAL TYPE SEWING MACHINES

Takashi Dohi; Kenichi Ohara, and Iwao Gotoh, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 20, 1974, Ser. No. 452,915
Claims priority, application Japan, Mar. 23, 1973, 48-33141
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² G05G *5/00*; H02P *3/06*; D05B *69/22*
U.S. Cl. 318—467 **9 Claims**



1. A needle position detector for a sewing maching having a motor drivable at high and low speeds, a needle armshaft

adapted to be driven selectively by said motor to cause the needle to move reciprocally between upper and lower dead points, comprising in combination:

a light source and a circuit including a single photoelectrical device disposed in opposed relation to said light source to receive a light beam therefrom;

a disc coaxially connected to said needle armshaft for rotation therewith in synchronism with the reciprocal movement of said needle;

said disc being disposed between said photoelectrical device and said light source and having cutaway portions permitting passage of said light beam from said light source to said photoelectrical device and intervening portions interrupting said light beam, with transition portions between said cutaway portions and said intervening portions passing between said light source and said photoelectrical device as said disc rotates to produce electrical signals in said circuit, said transition portions comprising a first transition portion disposed in predetermined angular relationship to said needle armshaft corresponding to the lower dead point to produce a first signal and an angularly spaced second transition portion disposed in predetermined angular relation to said needle armshaft corresponding to the upper dead point to produce a second signal;

first brake means for decelerating said motor to said low speed;

a needle-down switch for energizing said first brake means;

speed sensing means for detecting when said motor has decelerated to said low speed to deenergize said first brake means;

a needle-down position detector coupled to said speed sensing means and to said photoelectrical device to produce a needle-down position signal in response to said first signal;

second brake means responsive to said needle-down position signal for decelerating said motor to a standstill with the needle at the lower dead point;

memory means coupled to said needle-down position detector to receive said needle-down position signal;

a needle-up switch for operating said motor at said low speed; and

a needle-up position detector coupled to said needle-up switch, said memory means and said photoelectrical device to produce a needle-up position signal in response to said second signal;

said second brake means being receptive of said needle-up position signal to decelerate said motor to a standstill with the needle at said upper dead point.

4,013,934

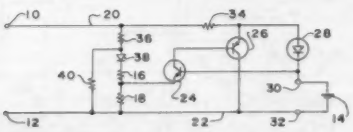
BATTERY CHARGING CIRCUIT

George J. Frye, 12175 SW. Douglas, Portland, Oreg. 97225

Continuation of Ser. No. 508,200, Sept. 23, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 629,775

Int. Cl.² H02J 7/04

U.S. Cl. 320—35 9 Claims



1. A circuit for charging a battery, comprising:

a regulated DC voltage source for providing current to charge said battery;

amplifier means for regulating said current to said battery by diverting at least a portion of said current through a conduction path in shunt with said battery;

biasing means connected to said amplifier means for providing a predetermined operating point, said amplifier means including at least a first transistor having its base connected to one terminal of said battery and its emitter coupled to said biasing means, said transistor being biased into conduction when the voltage across said battery reaches said predetermined operating point; and

temperature compensation means connected between said biasing means and said conduction path for compensating for the negative temperature coefficient of said battery.

4,013,935

CIRCUIT ARRANGEMENT FOR A DC TO DC CONVERTER

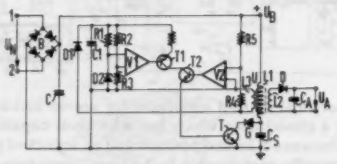
Bernd Josef Siepmann, Geretsried, and Peer Thilo, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 11, 1975, Ser. No. 603,679

Claims priority, application Germany, Sept. 20, 1974, 2445033

Int. Cl.² H02M 3/335

U.S. Cl. 321—2 11 Claims



1. A circuit arrangement for a dc to dc converter comprising:

a switching transistor including a base, a collector and an emitter, and operable into a state of saturation;

a transformer including a primary winding and a secondary winding, said primary winding connected in series with said collector and an operating voltage;

rectifier means connected to said secondary winding for providing at least one stabilized dc voltage; and

a load dependent control element connected to said switching transistor for controlling actuation and blocking said switching transistor, said control element including voltage comparison means for constantly comparing the collector-emitter voltage of said switching transistor with a reference value and blocking base current from said switching transistor in response to an actual voltage greater than the reference voltage just as said switching transistor comes out of saturation.

4,013,936

REGULATED HIGH VOLTAGE D.C. SUPPLY UTILIZING A PLURALITY OF D.C. TO D.C. CONVERTER MODULES

Joseph P. Hesler, Liverpool, and Samuel M. Korzekwa, Baldwinsville, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Nov. 12, 1975, Ser. No. 630,967

Int. Cl.² H02M 3/335

U.S. Cl. 321—2 10 Claims

1. A high voltage supply having a regulated output voltage comprising:

a. a plurality of modulatable d.c. to d.c. converters,

i. each converter having

i. input terminals for connection to a d.c. power source,

ii. a power transformer having a center tapped primary winding, the center tap being connected to one of said d.c. input terminals, and a secondary winding,

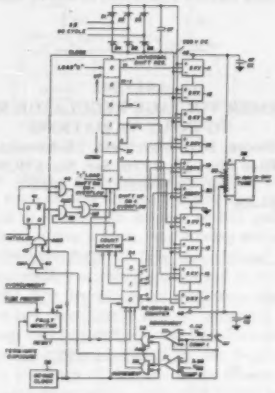
iii. a push-pull switching circuit comprising a pair of alternately conducting switching devices, each switching device being connected between the other

input terminal of said d.c. source and one end of said primary winding to produce an alternating voltage in said secondary winding during alternation which falls to zero when alternation stops,

iv. a rectifier bridge having a.c. input terminals to which said secondary winding is connected, and a pair of respectively positive and negative d.c. output terminals from which the rectified inverter output is taken,

2. i. each of "M" converters of said plurality having a control input to which modulation potentials may be applied to start or stop said alternation, and producing a first output voltage (V_M) for providing a coarse output voltage step and the remaining

ii. "N" vernier converters of said plurality having a control input to which modulation potentials may be applied and producing a second output voltage which is variable for providing a fine output voltage adjustment,



said "N" converters providing a total output voltage adjustment range at least approximately equal to (V_M),

3. means interconnecting said positive and negative converter output terminals for addition of the rectified d.c. potentials of all M and N converters to produce a high d.c. voltage output,

b. voltage comparison means having a first analog input proportional to the measured output voltage to produce an error signal indicative of the sign of the difference, and

c. logic means coupled to said voltage comparison means for response to said error signal and coupled to said control inputs of said "M" and "N" plurality of vernier converters for control thereof, said control adjusting the output voltage of said "N" vernier converters in a direction to reduce said difference, and when the upper limit of said adjustment range of said "N" vernier converters is crossed, activating an "M" coarse converter, and when the lower limit is crossed, inactivating an "M" coarse converter.

4,013,937

NATURALLY COMMUTATED CYCLOCONVERTER WITH CONTROLLED INPUT DISPLACEMENT POWER FACTOR

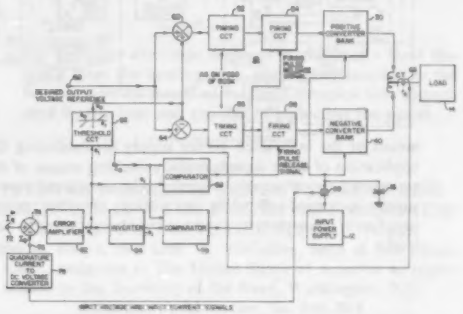
Brian R. Pelly, Lingfield, England, and Laszlo Gyugyi, Penn Hills Township, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 490,640, July 22, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 593,813

Claims priority, application France, July 22, 1975, 75.22821

Int. Cl.² H02M *5/27*; H02J *3/18*

U.S. Cl. 321—7 **12 Claims**



1. In a static frequency changer apparatus including positive and negative banks of controllable rectifiers operative between input and output terminals with at least one alternating current power system of lower frequency at said output terminals and with an alternating voltage source of higher frequency at said input terminals for natural commutation thereof; with said one power system having variable power load conditions; with said voltage source having a selected VA rating and frequency and generating a quadrature input current at said input terminals lagging the input voltage thereof by an amount of lag in relation to said variable load conditions; the combination of:

signal means for sensing a condition representative of said quadrature input current to derive a control signal;

control means responsive to said control signal for controlling said controllable rectifiers to generate between said positive and negative banks a circulating current of such amplitude as to maintain said quadrature input current lag to a predetermined amount.

4,013,938

POWER SUPPLY SYSTEM FOR PROVIDING UNINTERRUPTED OUTPUT POWER

Daniel J. McCoy, Roanoke, Va., assignor to General Electric Company, Salem, Va.

Filed Dec. 24, 1974, Ser. No. 536,287

Int. Cl.² H02H *7/122*

U.S. Cl. 321—14 **7 Claims**

1. An electric power supply system comprising:

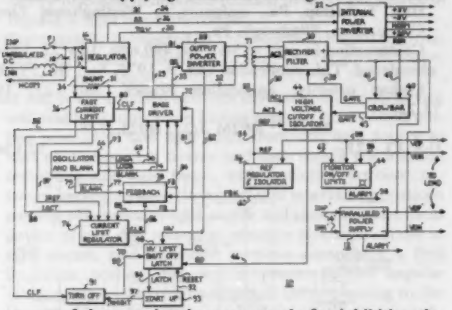
a. a plurality of parallel connected power supplies having substantially equal power ratings and operable at substantially the same output voltage, each of said power supplies capable of supplying full load current to an attached load and independently operable in the absence of any other power supplies, each of said power supplies including:

1. a controllable power inverter including primary and secondary circuits, said primary circuit including switching means responsive to drive signals for controlling the power coupled from said primary circuit to said secondary circuit,

2. drive means connected to said primary circuit for generating said drive signals;

b. an independently operable cutoff means associated with each of said power supplies for producing a shut-off signal when the voltage of its associated power supply secondary circuit exceeds a predetermined value; and,

c. means for supplying said shut-off signal to the drive



means of the associated power supply for inhibiting the application of drive signals to the switching means of the associated power supply whereby said associated power supply is turned off while permitting all other power supplies in the system to continue supplying power to said load.

4,013,939

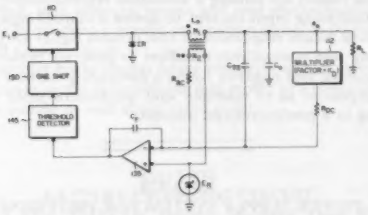
MULTIPLE FEEDBACK CONTROL APPARATUS FOR POWER CONDITIONING EQUIPMENT

John Biess, Canoga Park, and Yuan Yu, Palos Verdes Penn., both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Dec. 30, 1974, Ser. No. 537,294

Int. Cl.² H02M *3/10*; G05F *1/46*

U.S. Cl. 323—17 **6 Claims**



1. Control apparatus for power conditioning equipment, said equipment comprising selective switching means and an energy storage element, said energy storage element comprising a capacitor and an inductor having a power winding, said control apparatus comprising:

first electrical means for sensing only the final output DC voltage of said equipment,

second electrical means for sensing only the instantaneous dynamic energy level within said energy storage element, said second means comprising a signal winding on said inductor,

amplification means, responsive to said first and second electrical means, said amplification means generating an output signal,

threshold detection means to generate a control signal when the DC level of said amplification means output signal exceeds an established value, and

controller means, responsive to said control signal, for selectively operating said switching means.

4,013,940

SEMICONDUCTOR CIRCUIT DEVICE

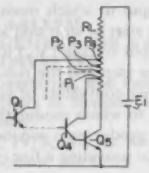
Isamu Kaji, Kyoto, Japan, assignor to Naoyuki Maeda, Inuyama, Japan

Filed Dec. 12, 1975, Ser. No. 640,391

Claims priority, application Japan, Dec. 21, 1974, 49-147241

Int. Cl.² G05F *1/56*

U.S. Cl. 323—22 T **5 Claims**



1. A semiconductor circuit device having a Darlington circuit including a power transistor connected to a load and a multiplicity of forward stage current amplifying transistors for driving subsequent current amplifying transistors and said power transistor, wherein plural intermediate taps are provided on said load connected to the collector of said power transistor and said current amplifying transistors having each of the collectors thereof connected to one of said taps, respectively.

4,013,941

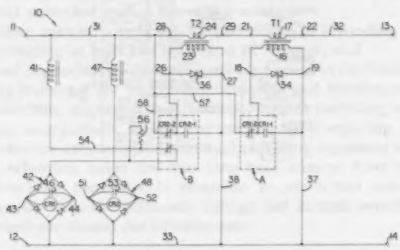
TRANSFORMER VOLTAGE REGULATOR RESPONSIVE TO INPUT VARIATIONS

Charles R. Moore, 1615 Merrifield, Mishawaka, Ind. 46544

Filed Mar. 26, 1976, Ser. No. 670,981

Int. Cl.² G05F *5/00*, *1/24*

U.S. Cl. 323—45 **8 Claims**



1. A voltage regulator apparatus for controlling a voltage at the output side of a line in accordance with variations of the voltage at the input side of the line, comprising:

a transformer having primary and secondary windings, said secondary winding being inserted in said line, said primary winding having a pair of input terminals;

control means including a switching means between said input side of said line and one of said pair of input terminals to said primary winding and between said pair of input terminals of said primary winding for at least one of (1) connecting said primary winding to said input side of said line and (2) shorting out of said primary winding and a series connected saturable inductor having a predefined saturation level and rectifier means connected to said input side of said line, said rectifier having an input terminal and an output terminal; and

sensing means responsive to a predefined voltage at said output terminals of said rectifier means occurring when said inductor is saturated, said sensing means being non-

responsive to said voltage at said output terminal when said inductor is in an unsaturated state, a responsiveness of said sensing means to said output voltage effecting an altering of the state of said switching means to at least one of connecting said primary winding to said input side of said line and shorting out said primary winding.

4,013,942

PHASE SHIFTER

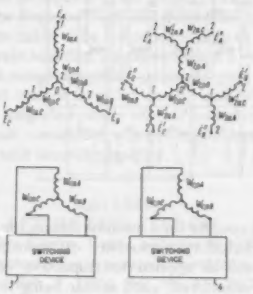
Valery Anatolievich Boshnyaga, 1, Kostjuzhensky pereulok 1; Lev Pavlovich Kalinin, ulitsa Stefana Velikogo 51-a, kv. 35, and Vitaly Mikhailovich Postolaty, ulitsa Demokraticheskaya 6/1, kv. 58, all of Kishinev, U.S.S.R.

Filed July 21, 1975, Ser. No. 597,888

Claims priority, application U.S.S.R., July 22, 1974, 2048088; July 22, 1974, 2048097; July 22, 1974, 2048099; July 22, 1974, 2048092

Int. Cl.² H02J *3/00*

U.S. Cl. 323—119 **4 Claims**



1. A phase shifter comprising three-phase multiwinding transformers, each of said transformers having primary windings connected in series with respect to like phases and arranged in a three-phase system, and having secondary windings and control windings, a first three-phase transformer having other secondary windings connected to said secondary windings of the first transformer, said secondary windings being arranged in a three-phase system, switching devices, the control windings of each three-phase transformer being connected to respective switching devices, the beginnings of the two secondary windings of the two other phases of the first three-phase transformer being connected to the beginnings of the secondary windings of each phase of the second transformer, the ends of said secondary windings of each phase of the second transformer being connected to a common neutral point.

4,013,943

SOLID STATE ELECTROLYTIC CELL GAS SENSOR HEAD

Jack Chou, and Doris H. Chou, both of 900 N. Broadway, Suite 725, Santa Ana, Calif. 92701

Continuation-in-part of Ser. No. 505,546, Sept. 13, 1974, Pat. No. 3,955,268. This application June 10, 1976, Ser. No. 694,840

Int. Cl.² G01N *27/00*; H01L *7/00*; G01N *27/62*

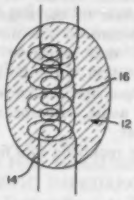
U.S. Cl. 324—33 **9 Claims**

1. A solid state electrolytic cell gas sensor head which causes the dissociation of gaseous impurities to be measured into charged species such as ions and complex ions and does not operate by changing the electro-conductivity of the sensor head in response to the adsorption of at least one gaseous impurity, comprising:

a relatively inert, electrolyte base material, capable of dissociating selected impurities into species such as ions and complex ions;

a signal source;

a fine, chemically inert, strong and ductile heating wire coupling signals from the signal source to the base; and



a fine collector electrode disposed in the base a short distance from the heating wire, electrically coupled to the heating wire by means of ions and complex ions dissociated by the base and capable of collecting the signal.

4,013,944

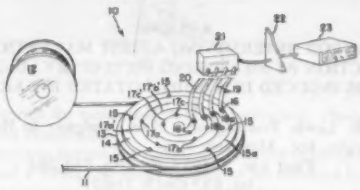
PRESSURE INSENSITIVE SYSTEM FOR MEASURING THE LENGTH OF A CABLE DEPLOYED UNDERWATER USING MAGNET ACTUATED REED SWITCHES

John A. Benya, and Gale W. McGuffey, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 2, 1976, Ser. No. 646,203

Int. Cl.² G01R *33/12*

U.S. Cl. 324—34 L **5 Claims**



1. An apparatus for measuring the length of cable deployed from a winch submerged in water comprising:

a fairlead sheave disposed in the water to receive the cable directly from the winch having a predetermined grooved circumference for rotatably receiving the cable;

a plurality of magnets radially mounted on the fairlead sheave for radiating electromagnetic energy;

a plurality of reed switches disposed adjacent to the magnets to be magnetically actuated by the magnets for thereby providing coded signals representative of the deployed length of the cable.

a plurality of sections of tubing disposed in the water, each being fluid filled and each containing at least one of the reed switches for ensuring compensation for ambient pressure variations and to assure reliable actuation thereof

means coupled to the reed switches for presenting a visual readout of the signals; and

means coupled to the sections of tubing and connecting the reed switches and the presenting means for maintaining a watertight integrity thereacross.

4,013,945

ROTATION SENSOR FOR BOREHOLE TELEMETRY

Donald S. Grosso, West Hartford, Conn., assignor to Teleco Inc., Middletown, Conn.

Filed May 12, 1975, Ser. No. 576,623

Int. Cl.² G01R *33/04*

U.S. Cl. 324—34 R **28 Claims**

1. A rotation sensing system for sensing the absence of

rotation of a rotatable member in an ambient magnetic field and activating a control mechanism upon the absence of rotation of the member, the rotation sensing system including:

fluxgate magnetometer means for generating an output signal as a function of the angular relationship of the magnetometer means to the direction of the ambient magnetic field said fluxgate magnetometer being mounted for rotation with the rotatable member and having a first output signal of known frequency and which varies in phase angle with the rate of rotation of the rotatable member;

detector means for receiving said first output signal;

means for generating a reference signal of the frequency of said first output signal, said reference signal being delivered to said detector means;

said detector means comparing the phase difference between said first output signal and said reference signal and generating a second output signal the frequency of which is commensurate with the rate of rotation of the rotatable member; and

signal generating means for receiving said second output signal and generating a third ouput signal when the frequency of said second output signal is commensurate with the absence of rotation.

4,013,946

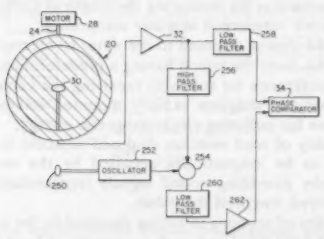
MEANS FOR DETERMINING A FIRST MAGNETIC FIELD DIRECTION BY MEASURING SECONDARY MAGNETIC FIELDS INDUCED IN A BODY ROTATED IN SAID FIRST FIELD

John R. Lewis, Framingham, Mass., assignor to Harnessed Energies, Inc., Maynard, Mass.

Filed Apr. 2, 1975, Ser. No. 564,284

Int. Cl.² G01R *33/02*

U.S. Cl. 324—43 R **19 Claims**



1. A device for determining the direction of a primary magnetic field comprising, in combination:

a body mounted for rotation about an axis of rotation and comprising means for defining at least one electrical path disposed transversely to said axis;

means for rotating said body about said axis;

means for detecting those secondary magnetic field components induced by rotation of said body in said primary magnetic field which are substantially at a frequency equal to the rotational frequency of said body, and for providing a corresponding first electrical signal responsively to said secondary field components;

means for generating a variable tertiary magnetic field at said body and at a frequency different from said secondary field;

means for detecting a fourth magnetic field induced by rotation of said body in said tertiary magnetic field and for providing a second electrical signal responsive to said fourth magnetic field; and

means for determining the relative phase shift of said first and second electrical signals, said phase shift being related to the direction of said primary field.

4,013,947

CENTRAL COUPLER FOR A CENTRALIZED MONITOR SYSTEM FOR MOTOR VEHICLES

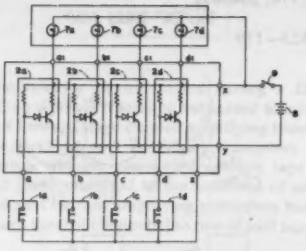
Hiroshi Arai, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 15, 1975, Ser. No. 605,215

Claims priority, application Japan, Jan. 21, 1975, 50-9410

Int. Cl.² G01R *31/02*; **B60Q** *1/00*

U.S. Cl. 324—51 **3 Claims**



1. A central coupler for a monitor system for motor vehicles of the type including a plurality of abnormality-detecting sensors disposed as applied to respective vehicle parts or objects to be monitored, each sensor being in the form of a switch of the functional type which is made on when the respective object is normal in the operating condition and off when the object shows abnormalities, and a corresponding plurality of warning display means, said central coupler comprising:

a housing;

a plurality of switching circuits accommodated in said housing each of which is made off and on in response to the on and off positions assumed by the associated sensor, each of said switching circuits also controlling an associated one of said warning display means; and

at least two multi-terminal connectors external to said housing, a first one of said connectors electrically coupling said plurality sensors to said switching circuits and a second one of said connectors electrically coupling said switching circuits to a source of D.C. power and further connecting said swiching circuits to said display means such that the operation of said switching circuits and said display means may be tested by disconnecting said first one of said connectors from said sensors, whereby a malfunction of either a switching circuit or a display means is indicated by a failure of said monitor system to give a warning.

4,013,948

DISCHARGE DETECTION SYSTEM FOR DETERMINING THE DISTANCE TO A DIELECTRIC WEAK POINT IN A CABLE

Shigenobu Tanaka; Hikaru Yasuhara, and Munesuke Oguchi, all of Sakura, Japan, assignors to The Fujikura Cable Works, Ltd., Tokyo, Japan

Filed Aug. 12, 1975, Ser. No. 604,028

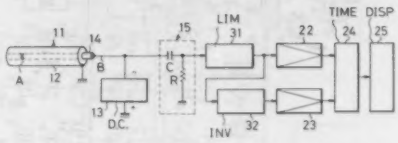
Claims priority, application Japan, Aug. 23, 1974, 49-96832

Int. Cl.² G01R *31/08*, *31/11*

U.S. Cl. 324—52 **1 Claim**

1. A cable test system consisting of a connector for connecting a cable to be tested to the system, a D.C. high voltage source connected between a terminal of said connector and

the ground, a differentiation circuit connected to said terminal, a limiter circuit connected to the output of said differentiation circuit, first and second pulse amplifier means coupled to the output of said limiter circuit for amplifying the output thereof, said first amplifier means amplifying pulses of only a first polarity and said second amplifier means amplifying pulses of only an opposite polarity, a time counter connected to the outputs of said first and second pulse amplifier means so as to be started by the output of said first amplifier means and

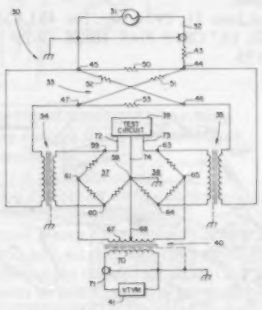


stopped by the output of said second pulse amplifier means and a display unit connected to the output of said time counter for displaying the distance from said connector to a dielectric weak point of the cable to be tested according to the output of said timer, wherein said first amplifier means comprises a first amplifier circuit which amplifies pulses of only one polarity and wherein said second amplifier means comprises a second amplifier which amplifies pulses of only said one polarity and an inverter circuit connected between the output of said limiter circuit and said second amplifier.

4,013,949
RETURN LOSS TEST SET

George E. Ice, San Carlos, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Feb. 9, 1976, Ser. No. 656,502
Int. Cl.² G01R 27/04
U.S. Cl. 324—58 B 9 Claims



1. Apparatus for testing the return loss of a balanced circuit under test having at least a pair of terminals which are ungrounded and are to operate into a load having a prescribed impedance, some balanced circuits under test also having a grounded center terminal, said apparatus comprising:

a pair of resistive bridges each having a bridge resistance which is equal to one half of the value of the prescribed impedance, one nodes of each of said bridges being electrically connected together and to a ground reference potential, one arm between said one node and an other node of each of said bridges being open;

first means connecting the pair of ungrounded output terminals of the test circuit to associated ones of said other nodes of said bridges, any center ground terminal of the test circuit being connected to said one nodes of said bridges;

second means for producing an indication which is a measure of the return loss of the circuit under test;

third means producing an AC test signal;

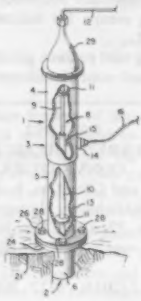
fourth means responsive to the output of said third means for coupling equal amplitude test signals of the same phase to said bridges; and

fifth means coupling a reflected output signal from the two nodes of said bridges that are opposite said one nodes and applying this reflected signal to said second means for providing an indication of the return loss of the test circuit.

4,013,950
APPARATUS FOR MEASURING THE ELECTROMAGNETIC IMPEDANCE OF SOILS

Robert A. Falls, Lorton, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 12, 1976, Ser. No. 676,099
Int. Cl.² G01R 27/04
U.S. Cl. 324—58.5 R 10 Claims



1. Apparatus for measuring the electromagnetic characteristics of soil comprising:

a. a telescopic slotted line having a telescopic outer conductor and a telescopic inner conductor surrounded by and coaxial with said telescopic outer conductor,

b. an earth probe having an outer conductor and an inner conductor surrounded by and coaxial with said outer conductor, and

c. means to electrically secure said telescopic slotted line to said earth probe.

4,013,951
CIRCUIT TESTING APPARATUS

Mitsuhiko Ezoe, and Hiroshige Ozawa, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Japan

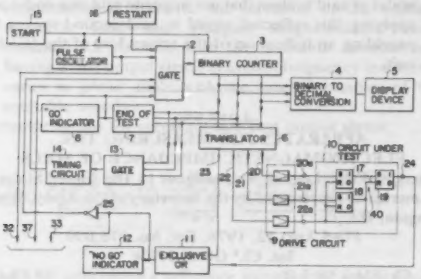
Filed July 31, 1975, Ser. No. 600,587
Claims priority, application Japan, Aug. 2, 1974, 49-88711; Sept. 17, 1974, 49-106942
Int. Cl.² G01R 15/12
U.S. Cl. 324—73 R 8 Claims

1. Apparatus for automatically applying a series of tests to an electrical circuit and indicating the result of the tests, comprising:

pattern generating means for generating a sequence of test pulse patterns and applying the same to a circuit to be tested and for generating a standard sequence of output pulse patterns corresponding to a sequence of output pulse patterns which would be developed by the circuit to be tested in response to the applied test pulse patterns if the circuit to be tested operates error free, said pattern generating means generating the test pulse patterns at respective intervals corresponding to intervals required by the circuit to be tested to develop output pulse patterns in response to respective ones of the test pulse patterns applied to the circuit to be tested;

means for comparing a sequence of output pulse patterns

developed by the circuit to be tested with the standard sequence of output pulse patterns to check for noncoincidence between the output pulse patterns developed in response to a test pulse pattern and corresponding pulse



patterns of the standard sequence of output pulse patterns; indicating means for indicating the result of the comparison; and

means for disabling said pattern generating means upon the occurrence of said noncoincidence.

4,013,952

MEANS FOR CURRENT MEASURING IN STATIC CONVERTORS

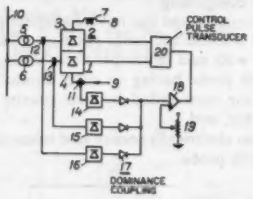
Bertil Hammarlund, and Göte Liss, both of Ludvika, Sweden, assignors to Asea Aktiebolag, Vasteras, Sweden

Filed Feb. 27, 1975, Ser. No. 553,730

Claims priority, application Sweden, Mar. 22, 1974, 7403873

Int. Cl.² G01R *19/22;* **H04B** *1/68*

U.S. Cl. 324—119 **3 Claims**



1. Means for measuring the load current in a static convertor (1,2) having an alternating current side and a direct current side, said measuring means having an output (18), which measuring means comprises a direct-current measurement device (11) on the direct-current (8,9) of the convertor and an alternating-current measurement device (12,13) of the alternating-current side (10) of the convertor, and a dominance coupling means (17 or 27–31) connecting said measurement devices for comparing the signals therefrom and selecting the greatest of said signals and for supplying such greatest signal to the output.

4,013,953

OPTICAL FLUID CONTAMINATION AND CHANGE MONITOR PROCESSING CIRCUIT

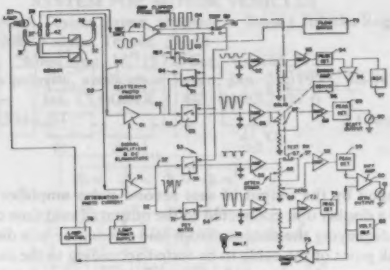
George Frank Skala, Scotia, N.Y., assignor to Environment-/One Corporation, Schenectady, N.Y.

Division of Ser. No. 352,614, April 19, 1973, Pat. No. 3,936,192, which is a continuation of Ser. No. 847,675, Aug. 5, 1969, abandoned. This application Nov. 7, 1974, Ser. No. 521,789

Int. Cl.² G01R *1/02;* **G01N** *21/22*

U.S. Cl. 324—130 **5 Claims**

1. A signal processing circuit for an optical fluid contamination monitor comprising input means for sequentially deriving separate reference and sample input signals of the same frequency; means for developing two separate sequential gate control signals of the same frequency and in phase with the respective reference and sample input signals; first and second gate means connected in parallel circuit relationship and supplied with said reference and sample input signals, said first gate means being responsive to a first one of said gate control



signals for passing only the reference input signal and said second gate means being responsive to the second of said gate control signals for passing only the sample input signal; indicator means responsive to the output from said second gate means for deriving an output indication of the valve of said sample signal; and regulating means responsive to the reference signal output from said first gate means for regulating the value of both said sample and reference signals.

4,013,954

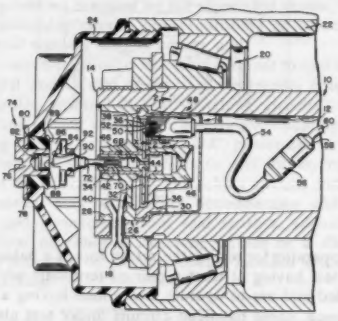
SPEED SENSOR ASSEMBLY

Brian C. Deem; Gilbert A. Pataky, and George W. Thompson, all of Elyria, Ohio, assignors to The Bendix Corporation, South Bend, Ind.

Filed June 21, 1974, Ser. No. 481,938

Int. Cl.² G01P *3/48;* **H02K** *19/20*

U.S. Cl. 324—173 **9 Claims**



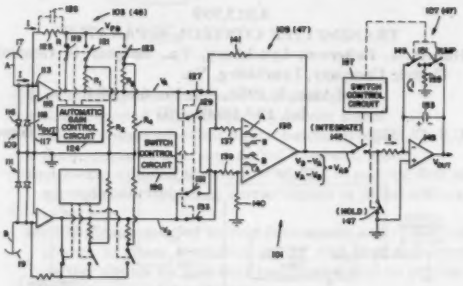
1. In a vehicle having a non-rotative axle, a vehicle wheel rotatably mounted on said axle, said axle defining a bore therewithin, and means for measuring the rotational velocity of said vehicle wheel, said measuring means being mounted within said bore and enclosed by said axle, said measuring means including a support, a tone wheel rotatably mounted on said support for rotation about the axis of the tone wheel, means mounting said support within said bore and substantially preventing movement of said support with respect thereto, means drivingly interconnecting said tone wheel with said vehicle wheel, and electromagnetic means mounted on said support adjacent said tone wheel for generating electrical signals proportional to the rotational velocity of said tone

wheel, a hub cap mounted for rotation with said vehicle wheel, said hub cap extending across the end of said axle, said drivingly interconnecting means being mounted on said hub cap and drivingly connected with said tone wheel for driving the latter with said vehicle wheel, said drivingly interconnecting means including a releasable connection to permit separation of the drivingly interconnecting means when the hub cap is removed.

4,013,955
ANALOG SIGNAL PROCESSOR

Peter B. Wagner, Reno, Nev., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 2, 1975, Ser. No. 592,852
Int. Cl.² H02M 7/00; H03K 5/00; 321 9 R;8 R;78;27
U.S. Cl. 324—72 **6 Claims**

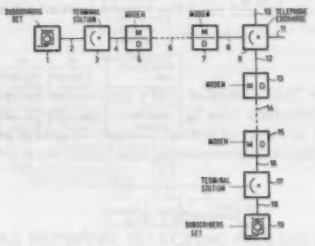


1. A analog signal processor comprising:
a. an analog current to voltage convertor;
b. a synchronous rectifier;
c. an integrate and hold circuit;
d. said analog current to voltage convertor includes first and second operational amplifiers;
e. first current means for producing a first alternating current signal and second current means for producing a second alternating current signal that is 180° out of phase with respect to said first alternating current signal;
f. said first current means being connected to the input of said first operational amplifier;
g. said second current means being connected to the input of said second operational amplifier;
h. the output of said first operational amplifier and the output of said second operational amplifier being connected to the input of said synchronous rectifier;
i. means for controlling said synchronous rectifier whereby the negative portion of the output siganl from said second operation amplifier is inverted and added to the positive portion of the output signal from said first operational amplifier and the negative portion of the output signal from said first operational amplifier is inverted and added to the positive portion of the output signal from said second operational amplifier;
j. the output of said synchronous rectifier being connected to the input of said integrate and hold circuit; whereby
k. the output of said integrate and hold circuit indicates a d.c. voltage output that is proportional to the output of said synchronous rectifier.

4,013,956
TELECOMMUNICATION SYSTEM WITH AUTOMATICALLY SWITCHED MODEMS

Johannes Dornaus; Jürgen Lahmer, and Bernd Refflinghaus, all of Nuremberg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 5, 1975, Ser. No. 574,614
Claims priority, application Germany, May 9, 1974, 2422504
Int. Cl.² H04B 1/44
U.S. Cl. 325—22 **4 Claims**



1. Telecommunication system of the type comprising two terminal stations which are coupled to one another for the transmission of information signals via a transmission path which includes at least one telephone exchange, at least one pair of modems which are included in one of the parts into which the telephone exchange divides the transmission path and serve to convert a given modulation type to a given other modulation type suitable for the part of the transmisson path situated between the said modems and vice versa, the improvement wherein of the pair of modems the one nearer to the exchange includes a signalling receiver means responsive to the detection of a given signalling signal from a terminal station for delivering a start signal at an output, and an auxiliary-signal generator means connected to that output for supplying, under the control of the start signal, an auxiliary signal constituted by at least one frequency component occurring in the frequency spectrum of the said second modulation type to another part of the transmission path, which part is connected to the said telephone exchange, said modem nearer to the telephone exchange including an auxiliary-signal detector means responsive to the detection of the said frequency component in a signal originating via the telephone exchange from another part of the transmission path connected to the telephone exchange for delivering a switching signal, and switching means connected to the auxiliary signal detector and to the auxiliary signal generator for disconnecting said auxiliary signal generator and for shunting this modem under the control of the switching signal.

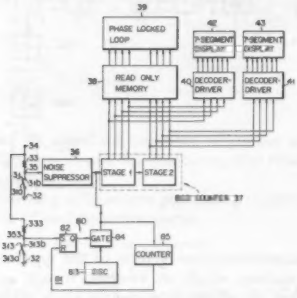
4,013,957
CHANNEL-SELECTING APPARATUS FOR A MULTICHANNEL TRANSCEIVER

Fumiaki Tojo, Tokyo, Japan, assignor to Kanda Tsushin Kogyo Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,562
Claims priority, application Japan, Apr. 26, 1975, 50-50248; May 13, 1975, 50-55475; May 29, 1975, 50-63515
Int. Cl.² H04B 1/44
U.S. Cl. 325—25 **20 Claims**

1. A channel-selecting apparatus for a multichannel transceiver which comprises:
channel changeover switch means including a first switch assembly operative to generate an electric pulse signal each time it is operated and a second switch assembly for producing a specified number of electric pulse signals each time it is operated;
counter means coupled with the switch means to count electric pulse signals delivered therefrom;

said second switch assembly comprising a normally open switch which includes a fixed contact and a movable contact, one of said contacts being connected to a DC power source; a bistable circuit whose set terminal is connected to the other contact of the normally open switch; an oscillator operative to generate a signal having a specified frequency; a gate circuit coupled with said oscillator, counter means and bistable circuit to allow the passage of a signal from the oscillator to the counter means only while the bistable circuit is set; and a further counter coupled with the gate circuit and bistable circuit to count signals delivered from the oscillator through the gate circuit and reset the bistable circuit when the count



made by said further counter reaches a predetermined value;

a read-only memory device provided with at least as many memory addresses as channels being selected and coupled with the counter means and having its memory addresses representing selected channel numbers designated by the counts made by the counter means; and

a phase locked loop circuit coupled with the read-only memory device to generate a local oscillation signal having a frequency assigned to any channel being selected in response to a specified output code signal delivered from the read-only memory device in accordance with the designated address thereof.

4,013,958

SAMPLED COMMUNICATION SYSTEM

Frank J. Spayth, Fort Wayne, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.

Filed Oct. 14, 1975, Ser. No. 621,889
Int. Cl.² H04J 3/12
U.S. Cl. 325—55 **15 Claims**

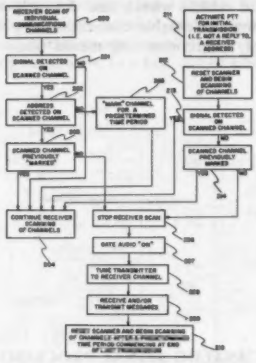
1. An apparatus for enhancing use efficiency of a plurality of communication channels in a communication system comprising:

receiving means for providing reception of signals on the communication channels;

signal sampling means connected to the receiving means for periodically sampling the communication channels and detecting signals present on each of the channels, the signal sampling means providing signals indicative of each of the communication channels in use;

transmitting means associated with the receiving means for providing transmission of signals on the communication channels; and

control means connected to the transmitting means and responsive to the signals from the sampling means for preventing for a predetermined time period after the cessation of the detected signals the transmission of signals from the transmitting means on a communication channel in use thereby preventing simultaneous transmis-


RECEIVER SCAN OF INDIVIDUAL COMMUNICATIONS CHANNELS
ACTIVATE PTT FOR INITIAL TRANSMISSION (I.E. NOT A REPLY TO A RECEIVED ADDRESS)
SIGNAL DETECTED ON SCANNED CHANNEL
RESET SCANNER AND BEGIN SCANNING OF CHANNELS
ADDRESS DETECTED ON SCANNED CHANNEL
"WAIT" CHANNEL FOR A PREDETERMINED TIME PERIOD
SIGNAL DETECTED ON SCANNED CHANNEL
SCANNED CHANNEL PREVIOUSLY "MARKED"
SCANNED CHANNEL PREVIOUSLY MARKED
CONTINUE RECEIVER SCANNING OF CHANNELS
STOP RECEIVER SCAN
GATE AUDIO "ON"
TUNE TRANSMITTER TO RECEIVER CHANNEL
RECEIVE AND/OR TRANSMIT MESSAGES
RESET SCANNER AND BEGIN SCANNING OF CHANNELS AFTER A PREDETERMINED TIME PERIOD COMMENCING AT END OF LAST TRANSMISSION

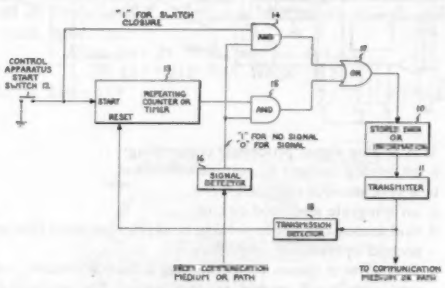
sion of signals on selected ones of the communication channels.

4,013,959

TRANSMITTER CONTROL APPARATUS

Hubert A. Patterson, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed Mar. 5, 1976, Ser. No. 664,084
Int. Cl.² H04B 1/02
U.S. Cl. 325—57 **6 Claims**



1. Apparatus for controlling the transmission of stored data or information from at least one of a plurality of radio transmitters or the like over a common medium comprising:

a. first gating means having first and second inputs and an output;

b. second gating means having first and second inputs and an output;

c. start signal producing means;

d. a repeating device having a start input connected to said start signal producing means and having an output at which a signal is repetitively produced at predetermined intervals in response to a start signal applied to said start input;

e. means responsive to the absence of transmission on said common medium for producing a first signal;

f. means connecting said inputs of said first gating means to said start signal producing means and to said medium responsive means for causing said first gating means to produce a first transmit signal in response to said start signal and said first signal occurring at the same time;

g. means connecting said inputs of said second gating means

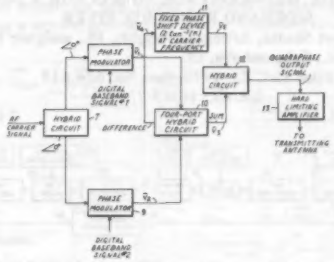
to said repeating device output and to said medium responsive means for causing said second gating means to produce a second transmit signal in response to said repetitive signal and said first signal occurring at the same time;

h. and means for connecting said first and second gating means outputs to said one transmitter so as to cause transmission in response to one of said transmit signals.

4,013,960
QUADRAPHASE MODULATOR

Sidney Godet, Little Falls, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Feb. 6, 1976, Ser. No. 655,806
Int. Cl.² H03C *3/00*
U.S. Cl. 325—139 **29 Claims**



1. A quadraphase modulator comprising:

a first source of radio frequency carrier signal;

a second source of a first digital baseband signal;

a third source of a second digital baseband signal;

first means coupled to said first source to provide first and second radio frequency carrier signals in phase with each other;

second means coupled to said first means and said second source to phase modulate one of said first and second carrier signals by said first baseband signal to provide a first phase modulated signal;

third means coupled to said first means and said third source to phase modulate the other of said first and second carrier signals by said second baseband signal to provide a second phase modulated signal;

fourth means coupled to said second and third means to provide a difference signal from said first and second modulated signals and to provide a sum signal from said first and second modulated signals;

fifth means coupled to said fourth means to phase shift said difference signal a predetermined amount;

sixth means coupled to said fourth and fifth means responsive to said sum signal and said phase shifted difference signal to produce a quadraphase output signal; and

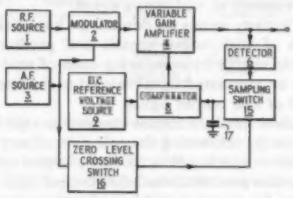
seventh means coupled to said sixth means to couple said quadraphase output signal to a transmitting antenna.

4,013,961
A.M. SIGNAL GENERATOR HAVING AN R.F. OUTPUT LEVEL CONTROL

Graham Martin Colebourn, St. Albans, England, assignor to Marconi Instruments Limited, Chelmsford, England

Filed July 14, 1975, Ser. No. 595,343
Claims priority, application United Kingdom, July 13, 1974, 31138/74
Int. Cl.² H04B *1/04, 1/68*
U.S. Cl. 325—144 **9 Claims**

1. An A.M. signal generator having an r.f. level control arrangement including a variable modulation means for producing an A.M. wave whose level is to be stabilised, a detector means for detecting said A.M. wave, means for sampling and storing the output of said detector means at instants occurring when the modulating wave passes through a predetermined amplitude level, and a comparator means for comparing the

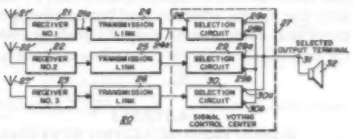


sampled and stored output with a reference D.C. voltage and arranged to apply the resultant of said comparision to the modulation means in opposite fashion to variation in the level of the A.M. wave about said predetermined amplitude level.

4,013,962
IMPROVED RECEIVER SELECTING (VOTING) SYSTEM

Kermit Myles Beseke; David Gordon Ramsland, both of Schaumburg, and Robert Bruce Stedman, Algonquin, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 14, 1975, Ser. No. 604,562
Int. Cl.² H04B *1/10*
U.S. Cl. 325—304 **22 Claims**



1. An improved receiver voting system for selecting at least one of several signals to be monitored, said system comprising:

a plurality of receivers, each receiver including means for receiving input signals and producing an output signal, said output signal substantially corresponding to said input signals in response to said input signals having a magnitude equal to and above a predetermined level and substantially corresponding to a predetermined status signal in response to the magnitude of said input signals being below said predetermined level;

a plurality of transmission line means for coupling the output signal of each of said plurality of receivers to a comparison location;

signal voting circuit means located at said comparison location for receiving the output signals of each of said receivers and selecting, for monitoring purposes, the one of said output signals which has the optimum signal quality level of all of the received output signals which correspond to said input signals; and

load means for receiving the selected output signal;

each of said output signal producing means of said receivers including,

variable squelch means for delaying by a first predetermined time the response of said output signal producing means to a change in the magnitude of said received input signals from below to above said predetermined level, said first predetermined time being related to the amount that the magnitude of said received input signals is above said predetermined level, and

delay means for creating, in response to a change in the magnitude of said input signals from above to below said predetermined level, an output signal pause which precedes in time the production of said output signal which corresponds to said status signal;

said voting circuit means including,

decoder means for producing, when said detector means is enabled, detect signals associated with any of said output signals which correspond to said status signal for at least a minimum time duration, said detect signals being used in preventing the selection of any output signal which corresponds to said status signal,

loss of activity means for detecting a loss of signal activity in each of said output signals and producing associated enable signals by comparing each of said output signals with an associated signal related to the background noise level of said output signal,

line failure detector means coupled to said loss of activity means for preventing the selection of any of said output signals in which a detected loss of signal activity exists for at least a predetermined duration of time,

circuitry for coupling said loss of activity detector means to said decoder means and, in response to a pause being detected in any of said output signals, enabling said decoder means for any of said output signals which include a detected pause,

filter means coupled to said loss of activity means and between said load means and said transmission line means for inserting a status signal filter between said load means and said transmission line means in response to a signal pause being detected by said loss of activity detector, said status signal filter preventing the load means from responding to a selected output signal having a detected audio pause followed by said status signal, and

signal loss equalization means for separately amplifying each of said received output signals by a gain factor which substantially compensates for the magnitude variation of said received output signals contributed by said transmission line means, whereby said voting circuit means compares said compensated output signals in order to select the output signal having the optimum signal quality level.

4,013,963
WIRED BROADCASTING SYSTEMS

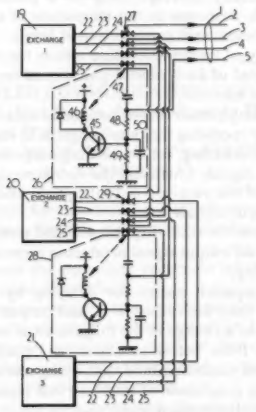
Eric John Gargini, West Drayton, England, assignor to Communications Patents Limited, London, England

Filed Aug. 6, 1975, Ser. No. 602,534

Claims priority, application United Kingdom, Aug. 6, 1974, 34512/74

Int. Cl.² H04N *1/44, 7/10*

U.S. Cl. 325—308 **4 Claims**



1. A wired broadcasting system comprising a program exchange, three program sources each presenting a plurality of video program signals at said exchange, three program selectors at said exchange each connected to a respective said source, a plurality of subscriber units connected to the exchange by respective cables to receive program signals from the respective program selectors, means located at each subscriber unit for controlling the respective program selectors connected to the program exchange by a two pair cable and provided with a first d-c control signal generating means for applying d-c program selector control signals to one of the pairs and a second control signal generating means for applying a second control signal to the other pair to control the connection of one of the program selectors to said cable, and two change over units controllable by said second control signal generating means, a first said change over unit constructed to disconnect a first said selector from said cable and to connect a second said selector thereto and the second said change over unit constructed to disconnect said second selector from said cable and to connect the third selector thereto.

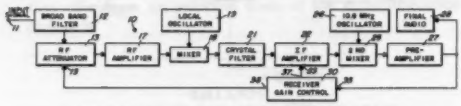
4,013,964
AUTOMATIC GAIN CONTROL MEANS FOR A SINGLE SIDEBAND RADIO RECEIVER

Frank Robert Skutta, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 22, 1975, Ser. No. 624,615

Int. Cl.² H04B *1/16*

U.S. Cl. 325—319 **7 Claims**



1. Automatic gain control means for a single sideband radio receiver comprising:

a. signal amplifying means forming a portion of the radio receiver and including an input adapted to receive a signal for controlling the gain of said signal amplifying means;

b. audio amplifying means forming a portion of the radio receiver and providing an audio output signal;

c. capacitive storage means having an output coupled to the input of said signal amplifying means for supplying a signal to control the gain thereof;

d. first coupling circuitry connecting the audio output signal of said audio amplifier means to said capacitive storage means in a first charging path for charging said capacitive storage means at a first predetermined rate; and

e. second coupling circuitry, including switching means only operative when the audio output signal exceeds a predetermined value, connecting the audio output signal of said amplifier means to said capacitive storage means in a second charging path, when said switching means is operative, for charging said capacitive storage means at a second predetermined rate faster than the first predetermined rate.

4,013,965
CIRCUIT FOR PREVENTING ERRORS IN DECODING INFORMATION FROM DISTORTED PULSES

James A. Scharf, Jr., P.O. Box 267, 627 Fremont Ave., South Pasadena, Calif. 91030

Continuation of Ser. No. 494,928, Aug. 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 423,171, Dec. 10, 1973, abandoned. This application Feb. 5, 1976, Ser. No. 655,556

Int. Cl.² H04L *27/10*

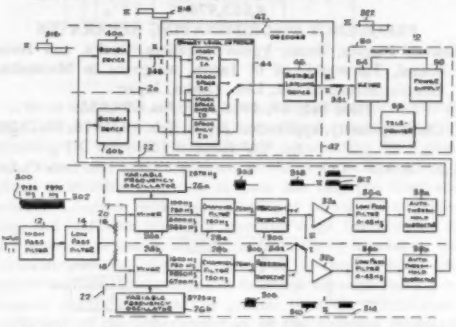
U.S. Cl. 325—320 **34 Claims**

1. A frequency shift converter for converting at least first and second series of information AC signals having first and second frequencies respectively to a series of binary coded DC pulses comprising:

at least first and second demodulator channels, each demodulator channel detecting the envelope of each received information AC signal in one series of information

AC signals, said first demodulator channel comprising a first mixer means for mixing two AC signals, a first oscillator means for generating a first oscillating AC signal having a first selected frequency, a first filter means for filtering AC signals, and a first demodulator means for demodulating AC signals, said first mixer means mixing first oscillating AC signal from said first oscillator means with AC signals in said first series of AC information signals to produce at least first intermediate AC signals having a first predetermined frequency, said first filter means filtering said first intermediate AC signals to pass substantially only AC signals having said first predetermined frequency, said first demodulator means detecting said filtered first intermediate AC signals to produce a first series of pulsating DC sgnals in response to said first series of information AC signals;

said second demodulator channel comprising a second mixer means for mixing two AC signals, a second oscillator means for generating a second oscillating signal having a second selected frequency, a second filter means for



filtering AC signals, and a second demodulator means for demodulating AC signals, said second mixer means mixing second oscillating AC signals from said second oscillator means with AC signals in said second series of information AC signals to produce at least second intermediate AC signals substantially having said first predetermined frequency, said second filter means filtering said second intermediate AC signals to pass substantially only AC signals having said first predetermined frequency, said second demodulator means detecting said filtered second intermediate AC signals to produce a second series of pulsating DC signals in response to said second series of information AC signals;

said first and second oscillating signals each having a frequency not at the mid-frequency between said first and second frequencies of said first and second information AC signals; and

means for combining said series of pulsating DC signals from said demodulator channels to produce a series of binary coded DC pulses.

4,013,966
FM RF SIGNAL GENERATOR USING STEP RECOVERY DIODE

Kenneth J. Campbell, Solana Beach, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

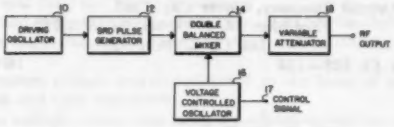
Filed Oct. 16, 1975, Ser. No. 622,925
Int. Cl.² H04B 1/02
U.S. Cl. 325—363 **9 Claims**

1. In a signal generator for generating frequency modulated RF signals available for testing key parameters of FM receivers the combination comprising:

a. signal generating means for generating an output signal of a predetermined frequency;

b. pulse generating means coupled to said signal generating means for generating narrow output pulses at said predetermined frequency;

c. modulator circuit means coupled to said pulse generating means;

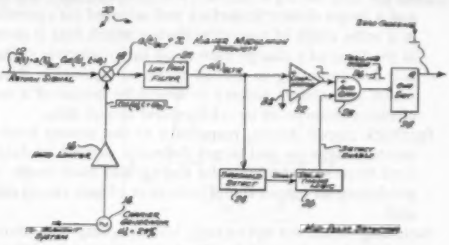


d. variable frequency signal means coupled to said modulator circuit means for frequency modulating said narrow pulses to provide a plurality of frequency modulated RF signals at the output of said modulator circuit means.

4,013,967
MID-PULSE DETECTOR

Frank A. Fassbind, Seattle, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 29, 1976, Ser. No. 681,317
Int. Cl.² H03K 9/10
U.S. Cl. 329—104 **1 Claim**



1. Apparatus, in a receiver, for detecting the mid-pulse phase reversal of an input signal $s(t) = a(t)_{BLT} \cos(\omega_0 t + \theta_1)$, where the signal $a(t)_{BLT}$ is a modulating signal $a(t)$ after band-limiting by a transmitter and $\cos(\omega_0 t + \theta_1)$ relates to a carrier having a frequency f_0, comprising:

means for generating a signal having a frequency of f_0;

a hard-limiter whose input is connected to the signal generating means, and whose output is the signal $\sin(\omega_0 t + \theta_2)$ hard limited, and θ_2 is the phase change due to the hard limiting;

a multiplier circuit, whose two inputs are connected to the input signal $s(t)$ and the output of the hard limiter, the output of the multiplier comprising the signal $a(t)_{BLT}$ plus the sum of higher modulation products;

a low-pass filter, whose input is connected to the output of the multiplier and whose output is $a(t)_{BLTR}$, which is the signal $a(t)$ as modified by the band limiting effects of the transmitter and receiver, the higher modulation products being filtered out by the low-pass filter;

a threshold detector, whose input is connected to the output of the low-pass filter, which senses the presence of a received pulse;

a delay timing logic circuit, whose input is connected to the output of the threshold detector, for delaying its output signal with respect to its input signal;

a comparator, serving the function of a zero crossing detector, whose input is connected to the output of the low-pass filter, which detects the mid-pulse zero crossing of a $a(t)_{BLTR}$, and therefore of $a(t)$;

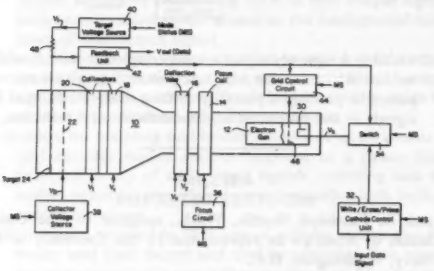
an AND gate, whose inputs are connected to the outputs of the comparator and of the delay timing logic circuit, and whose output comprises a positive-going pulse whose trailing edge represents the mid-pulse of $a(t)_{BLTR}$; and

a one-shot, whose input is connected to the output of the AND gate, and whose output is a sharp pulse representing the mid-pulse of $a(t)$.

4,013,968
FEEDBACK CONTROLLED STORAGE TUBE DEVICES

Kenneth A. Huelsman, Carlsbad, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 14, 1975, Ser. No. 558,530
Int. Cl.² G11C *11/23*
U.S. Cl. 328—124 18 Claims



1. In combination:

a storage tube having a cathode, a target conductor element and a target dielectric surface and adapted for operating in a write mode of operation during which data is stored in the form of a charge pattern on said dielectric surface and for operating in a read mode of operation during which said charge pattern is sensed by means of a read electron beam so as to retrieve said stored data;

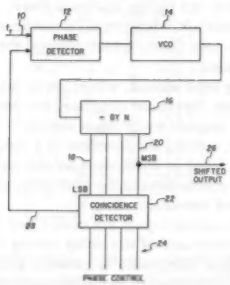
feedback circuit means, responsive to the sensed level of stored charge on said target dielectric surface as data is read from said storage tube during said read mode, for producing an output signal indicative of said stored data; and

switching means for operatively intercoupling, only during said read mode, said feedback circuit means with said storage tube, so that during said read mode the potential between said cathode and target conductor is continuously and automatically controlled as a function of the output signal from said feedback circuit means so as to allow readout of data written over a range of charge levels associated with a plurality of transfer characteristic curves of the target structure of said storage tube.

4,013,969
PROGRAMMABLE DIGITAL PHASE CONTROL APPARATUS

Charles M. Dennison, Hiawatha, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 18, 1976, Ser. No. 668,105
Int. Cl.² H03B *3/04*
U.S. Cl. 328—155 3 Claims



1. Phase shifting apparatus comprising in combination:

phase detector and variable frequency oscillator means including first and second input means and an output means for providing an output signal which changes in frequency in accordance with difference in phase of signals applied to said input means thereof;

means for supplying a reference frequency signal to said first input means;

counter means connected to said output means of said oscillator means for providing a repetitive series of digital word outputs of the number of cycles generated;

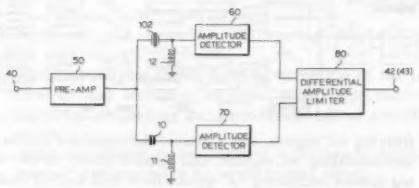
variable count detection means, connected between said second input means and to said counter means for providing a signal to said phase detector whenever the count of said counter means coincides with a predeterminable count set in said count detection means; and

apparatus output means, connected to said counter means, for providing an output signal phase shifted from, but of the said frequency as, the reference frequency.

4,013,970
FREQUENCY DISCRIMINATING APPARATUS

Takashi Nagata, Ikeda; Yasuo Nakajima, Osaka, and Teruo Kitani, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 19, 1976, Ser. No. 659,555
Claims priority, application Japan, Feb. 19, 1975, 50-21205
Int. Cl.² H03D *3/16*
U.S. Cl. 329—117 6 Claims



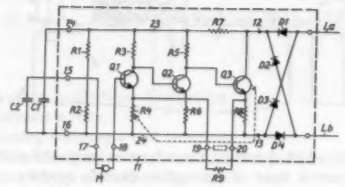
1. A frequency discriminating apparatus for discriminating a frequency in comparison with a predetermined frequency as a center frequency of frequency discrimination, comprising: a pre-amplifier for receiving an input signal to said apparatus and including a tuning circuit for tuning said input signal; a reference capacitor coupled to said pre-amplifier for receiving at the input terminal thereof an output signal from said pre-amplifier; a piezoelectric resonator having a piezoelectric lead titanate ceramic plate with an input electrode and an output electrode on entire opposed major surfaces thereof, respectively, said input electrode being coupled to said pre-amplifier for receiving said output signal from said pre-amplifier, said ceramic plate being poled with a poling field of not less than 50 kV/cm in the thickness direction of said ceramic plate and having a thickness for causing it to vibrate in the thickness-extensional vibration made at the 3rd harmonic overtone of said ceramic plate upon being excited by said output signal from said pre-amplifier for setting the center frequency of frequency discrimination between the resonant frequency and the anti-resonant frequency of said 3rd harmonic overtone of said ceramic plate; a first amplitude detector coupled to said output electrode of said piezoelectric resonator for detecting the amplitude of the output signal from said output electrode of said piezoelectric resonator; and second amplitude detector coupled to the output terminal of said reference capacitor for detecting the amplitude of the output signal from the output terminal of said reference capacitor; and a differential amplitude limiter coupled to said first amplitude detector and said second amplitude detector for differentially adding output signals from said first and said second amplitude detectors and for limiting the added output signals from said first and said second amplitude detectors to predetermined amplitudes in two frequency ranges, one of which includes said resonant

frequency and the other of which includes said anti-resonant frequency of said 3rd harmonic overtone of said ceramic plate.

4,013,971
INTEGRATED AMPLIFIER

Olaf Sternbeck, Bromma, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 19, 1975, Ser. No. 633,509
Claims priority, application Sweden, Dec. 4, 1974, 7415220
Int. Cl.² H03F 3/04
U.S. Cl. 330—23 **10 Claims**

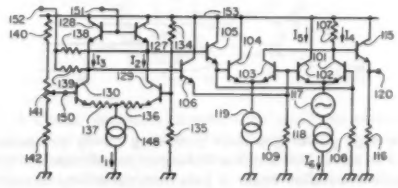


1. In an integrated amplifier comprising an output transistor stage connected to a pair of terminals for simultaneously receiving DC operating currents and transmitting AC signals and at least one other transistor amplifier stage formed on a silicon monolithic chip and at least one negative feedback network coupled between said output transistor amplifier stage and said other transistor amplifier stage, the elements of said network including resistors at least partly formed on the silicon monolithic chip, characterized in that at least one resistor included in the negative feedback network has a temperature coefficient which is greater than the temperature coefficient of the other resistors in the negative feedback network, and in that said one resistor is situated on the monolithic chip geometrically adjacent but not in contact with said output transistor amplifier stage so that the amount of negative feedback is dependent on the amount of heating of the monolithic chip in the region of said output transistor stage caused by the amplitude of the operating current passing through said output transistor amplifier.

4,013,972
AMPLIFIER WITH GAIN CONTROL MEANS

Shigeo Nishitoba, and Kazuo Tokuda, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed May 3, 1976, Ser. No. 682,799
Claims priority, application Japan, May 7, 1975, 50-55719
Int. Cl.² H03G 3/30
U.S. Cl. 330—29 **5 Claims**

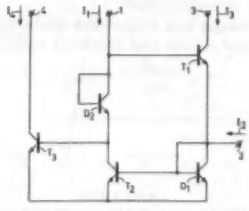


1. An amplifier comprising:
- a differential amplifier having a common electrode terminal, first and second bias terminals and an output terminal;
- means for applying an input signal to said common electrode terminal of said differential amplifier;
- first and second transistors whose emitters are connected to said first and second bias terminals, respectively;
- third and fourth transistors whose collectors are connected to the respective bases of said first and second transistors;
- a constant current source coupled to the respective emitters of said third and fourth transistors;
- fifth and sixth transistors whose emitters are connected to the respective collectors of said third and fourth transistors;
- a constant voltage source connected to the bases of said fifth and sixth transistors;
- a bias voltage source impressing a constant voltage on the base of said third transistor;
- means for applying bias voltage to the base of said fourth transistor; and
- first and second current supply sources for supplying currents to said first and second transistors, respectively.

4,013,973
AMPLIFIER ARRANGEMENT

Rudy Johan van de Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 17, 1975, Ser. No. 596,663
Claims priority, application Netherlands, July 22, 1974, 7409851
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D **12 Claims**



1. An amplifier comprising, first and second input terminals, first and second output terminals, a common terminal, a first transistor, means connecting the collector-emitter path of the first transistor in series with a first semiconductor junction between the first output terminal and the common terminal so as to form a common junction point between the first transistor and the first semiconductor junction, a second transistor, means connecting a second semiconductor junction in series with the collector-emitter path of the second transistor between the first input terminal and the common terminal, means connecting the first semiconductor junction in shunt with the base-emitter junction of the second transistor, means connecting the base of the first transistor to the first input terminal, a third transistor with its collector-emitter path connected between the second output terminal and the common terminal, means connecting the base of the third transistor to the collector of the second transistor, and means connecting said second input terminal to said common junction point between the first transistor and the first semiconductor junction.

4,013,974
MICROSTRIP BROADBAND AVALANCHE DIODE AMPLIFIER

John P. Quine, Colonie, N.Y., assignor to General Electric Co., Schenectady, N.Y.

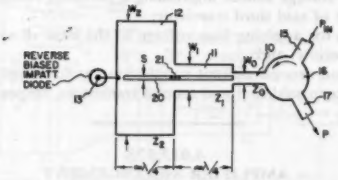
Filed Mar. 22, 1976, Ser. No. 669,319
Int. Cl.² H03F 3/10; H03H 7/38
U.S. Cl. 330—34 **11 Claims**

1. A broadband microwave semiconductor diode amplifier comprising
- a dielectric substrate having a continuous conductive ground plane on one major surface and, on the other major surface, a two-section microstrip impedance transformer comprising first and second quarter wavelength

sections at a selected microwave frequency, said first transformer section being coupled to an output microstrip transmission line having a predetermined characteristic impedance,

a microwave semiconductor diode means connected symmetrically to an edge of said second transformer section, said first and second transformer sections each having respective width dimensions selected to match the impedance of said microwave diode means to the output line impedance with the width of said second transformer section being at least approximately one-half wavelength, said two section transformer further having a longitudinal slot located centrally of the width dimension and an absorbing resistor bridging the slot for suppressing spurious mode resonance, and

means for biasing said microwave diode means and transmitting input signals and amplified output signals.



4,013,975

VARIABLE RESISTANCE CIRCUIT

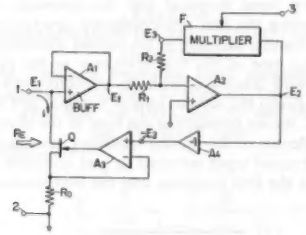
Koji Kataoka, and Hisayuki Uchiike, both of Musashino, Japan, assignors to Kabushikikaisha Yokogawa Denki Seisakusho, Tokyo, Japan

Filed Mar. 26, 1976, Ser. No. 670,673

Claims priority, application Japan, Mar. 31, 1975, 50-38758; Mar. 31, 1975, 50-38759

Int. Cl.² H03G *11/00, 3/12, 3/18;* **H03F** *3/16*

U.S. Cl. 330—145 **10 Claims**



1. A variable resistance circuit comprising: a field effect transistor having drain, source and gate electrodes; a terminal connected to one of said drain or said source of said field effect transistor; an amplifier having a feedback circuit including a multiplier; a differential amplifier having a first and second input and an output; said terminal being connected to said first input through said amplifier; the other one of said source or said drain of said field effect transistor being connected to said second input; said gate of said field effect transistor being connected to said output; and a reference resistor connected between said other one of said source or said drain and a common potential point; wherein an equivalent resistance present between said terminal and said common potential point is selectively utilized.

4,013,976

GAS DYNAMIC LASERS

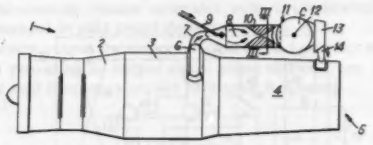
Roland John Hill, Quarndon, and Norman Thomas Jewell, Mickleover, both of England, assignors to Rolls-Royce (1971) Limited, London, England

Continuation-in-part of Ser. No. 272,842, July 18, 1972, Pat. No. 3,899,749. This application Jan. 21, 1975, Ser. No. 542,864

Claims priority, application United Kingdom, July 20, 1971, 33872/71

Int. Cl.² H01S *3/22, 3/095*

U.S. Cl. 331—94.5 G **29 Claims**



1. A method of operating a combustion powered air-breathing gas dynamic laser of the carbon dioxide type by

taking gases from a continuous combustion engine,

burning in said engine gases at least one fuel to produce a gaseous mixture for lasing, and

passing said gaseous mixture through said laser; said continuous combustion engine being a gas turbine engine, said gases taken from said engine being diverted from the normal flow path therethrough into an auxiliary flow path including therein said laser, said at least one fuel including at least one hydrocarbon fuel whereby the gaseous H_2O:CO_2 ratio in the combustion gases is caused to be in the range between 2:1 and 1:11.5, and said gaseous mixture being lased by aerodynamically expanding said mixture supersonically and passing it through an optically resonant cavity.

4,013,977

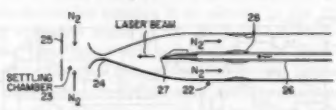
AERODYNAMIC WINDOW FOR CHEMICAL LASER

Hermann W. Behrens; Gerhard L. Grohs, both of Rancho Palos Verdes, and Charles L. Dailey, Palos Verdes Estates, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Sept. 11, 1975, Ser. No. 612,619

Int. Cl.² H01S *3/02*

U.S. Cl. 331—94.5 D **4 Claims**



1. A high power gas laser providing cavity pressures of about 1 to about 200 torr and having an aerodynamic window to permit a radiation beam to pass from the cavity to ambient atmosphere, said window comprising:

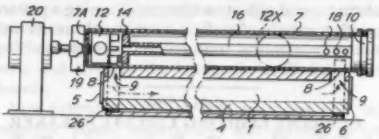
a. an optical duct axially aligned and surrounding the beam, the interior of said duct being in communication with the laser cavity to maintain the duct at cavity pressure, said duct having an inclined leading edge; and

b. means for providing a supersonic flow of gas against the leading edge of said duct, whereby the gas expands tangentially across the leading edge thereof and then flows along the exterior of said duct.

4,013,978
LASERS AND PHOTOCOAGULATORS

Pio Burlamacchi; Riccardo Pratesi, and Umberto Vanni, all of Florence, Italy, assignors to Consiglio Nazionale delle Ricerche, Rome, Italy

Filed Sept. 25, 1975, Ser. No. 616,889
Claims priority, application Italy, Sept. 27, 1974, 9577/74
Int. Cl.² H01S 3/092
U.S. Cl. 331—94.5 L 9 Claims

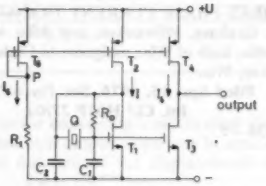


1. A wave guide laser comprising
a resonant cavity;
a housing defining a cell receiving recess;
a pair of flash tubes supported by the housing on opposite sides of the cell receiving recess;
reflectors for said flash tubes supported by the housing;
an elongate wave guide cell removably located in the recess, the cell having two opposite parallel transparent walls, each of which is arranged to face a corresponding flash tube when the cell is located in the recess;
a reservoir secured to the cell and communicating with opposite longitudinal ends of the cell;
an active liquid comprising a dye in solution filling the cell and the reservoir; and
circulation means located in the liquid for circulating the liquid between the cell and the reservoir.

4,013,979
CMOS OSCILLATOR WITH FIRST AND SECOND MOS TRANSISTORS OF OPPOSED TYPE INTEGRATED ON THE SAME SUBSTRATE

Eric Vittoz, Cernier, Switzerland, assignor to Centre Electronique Horloger S.A., Neuchatel, Switzerland

Filed Sept. 22, 1975, Ser. No. 615,709
Claims priority, application Switzerland, Sept. 20, 1974, 12789/74
Int. Cl.² H03B 5/24, 5/36
U.S. Cl. 331—108 B 13 Claims

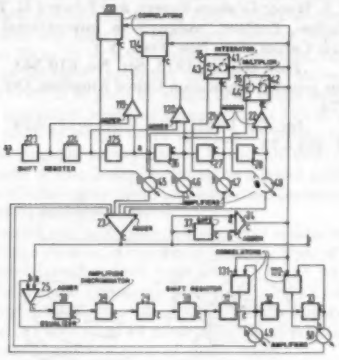


1. A CMOS oscillator in which the oscillator circuit comprises a first and a second MOS transistor of opposed type integrated on the same substrate, the source-drain path of the first transistor being connected in series with the drain-source path of the second transistor between the terminals of a voltage supply and the drain and gate of the first transistor being coupled to each other through a frequency determining network, and at least a third MOS transistor (T_6, T_8, T_{12}) of the same channel type as the second transistor, integrated on the same substrate, the sources of the said second and third transistors being connected together to one terminal of the voltage supply and the gates thereof being connected together to a point (P) at a potential such that the mean drain current of the first transistor is maintained at a value just higher than the value at which oscillation starts.

4,013,980
EQUALIZER FOR PARTIAL RESPONSE SIGNALS

Gero Schollmeier, Gauting, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 560,320, March 20, 1975, abandoned, which is a continuation of Ser. No. 419,092, Nov. 26, 1973, abandoned. This application June 26, 1975, Ser. No. 590,507
Claims priority, application Germany, Jan. 5, 1973, 2300480
Int. Cl.² H04B 3/04; H03H 7/16
U.S. Cl. 333—18 6 Claims



1. In an equalizer for partial response signals comprising a multi-stage shift register coupled to a first analog adder, a corrected signal being produced from the output of said first analog adder, the improvement comprising;
second analog adder means having inputs connected to outputs of at least two of the stages of said shift register,
amplifier means including means for adjusting the gain thereof responsive to the value of the control signal coupled thereto, one of said outputs of said two stages of said shift register being connected to an input of said amplifier means and from an output thereof to an input of said first analog adder,
correlator means for producing said control signal which is coupled to said amplifier means and having an input connected to an output of said second analog adder means.

4,013,981
CONSTANT-RESISTANCE COUPLED-LINE TYPE EQUALIZER

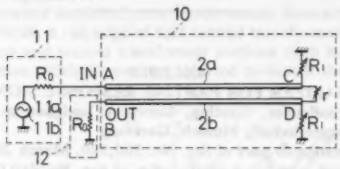
Sotokichi Shintani, Mitaka; Michitoshi Tamori, Tanashi, and Nobuo Nagai, Sapporo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed June 19, 1975, Ser. No. 588,221
Claims priority, application Japan, June 29, 1974, 49-74488
Int. Cl.² H03H 7/14
U.S. Cl. 333—28 R 5 Claims

1. An equalizer including a four port directional coupler using strip coupling lines, characterized in that two far end ports of the directional coupler are grounded through two resistances R_1, respectively, while interconnecting the two far end ports through a resistance r, an input port is formed at one

of the near end ports of the directional coupler, and an output port is formed at the other end thereof, wherein

$$G_1(G_1+2g)=G_0^2$$



where, $G_1=1/R_1$, $g=1/r$, $G_0=1/R_0$, and R_0 is the resistance of a power source and a load.

4,013,982
PIEZOELECTRIC CRYSTAL UNIT

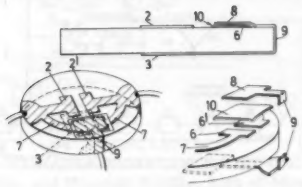
Alan F. B. Wood; Graham Rogers, and Edward G. Tuckett, all of Harlow, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,343

Claims priority, application United Kingdom, Oct. 22, 1974, 45609/74

Int. Cl.² H03H *9/20, 9/04, 9/32, 9/24*

U.S. Cl. 333—72 **2 Claims**



1. A piezoelectric crystal unit comprising a piezoelectric crystal element having on opposite faces thereof an electrode pattern with at least one of said patterns being extended to the other face of the element where a portion of said extension is in juxtaposition with an extended portion of the other of said patterns with a dielectric layer between the two portions.

4,013,983
SURFACE WAVE ELECTRO-MECHANICAL DEVICE

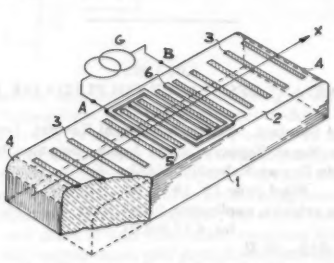
Pierre Hartemann, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Nov. 7, 1975, Ser. No. 629,963

Claims priority, application France, Nov. 8, 1974, 74.37075

Int. Cl.² H03H *9/04;* **HO3H** *9/26;* **H03H** *9/32, 9/30*

U.S. Cl. 333—72 **12 Claims**



1. A surface wave electromechanical device comprising a crystalline substrate having a face for propagating surface wave vibratory energy, at least one electromechanical transducer positioned on said face for radiating said surface wave vibratory energy, and surface wave selectively reflecting means arranged in said face for receiving said surface wave vibratory energy; said surface wave selectively reflecting means comprising at least one grating of reflective elements causing along the propagation path of said surface wave vibrating energy a periodic physical modification of the propagation characteristics of said crystalline substrate; said periodic physical modification arising from the creation in said face of ion implanted areas wherein numerous point defects are introduced in the regular lattice structure of said crystalline substrate; said reflective elements forming a pattern coinciding with a pattern of surface wave wavefronts launched by said electro-mechanical transducer, and separated from one another by a half wavelenght.

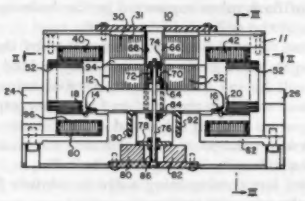
4,013,984
CURRENT LIMITING CIRCUIT BREAKER

John A. Wafer, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 22, 1975, Ser. No. 607,006

Int. Cl.² H01H *3/00*

U.S. Cl. 335—185 **17 Claims**



1. A circuit interrupter comprising:
a housing;
a bridging contact arm disposed within said housing;
a pair of movable contacts attached in spaced apart relationship to said bridging contact arm;
a pair of stationary contacts supported within said housing aligned with said pair of movable contacts;
magnetic drive means having a magnetically open slot formed therein within which is disposed said bridging contact arm in proximity to the open end thereof; and
a pair of yokes formed of ferromagnetic material each disposed around one movable contact and one stationary contact for enhancing arc movement during circuit interruption.

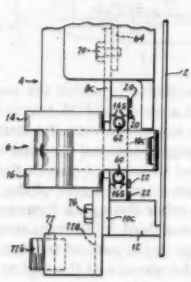
4,013,985
THREE-PHASE CURRENT TRANSFORMER

Robert O. Graham, Milwaukee, and John A. Rauenbuehler, New Berlin, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Apr. 15, 1976, Ser. No. 677,407

Int. Cl.² H01F *27/04*

U.S. Cl. 336—5 **10 Claims**



1. A unitary plural-phase current transformer comprising:

an insulating housing comprising abutting, complementary housing parts having a plurality of walls enclosing a plurality of cavities therewithin and pairs of adjoining notches in abutting edges of corresponding walls thereof providing a pair of holes from each said cavity to the outside;

a plurality of secondary coil and loop magnetic core combinations, one in each of said cavities;

a plurality of pairs of terminal inserts retained in said pairs of holes with the inserts of each pair thereof connected to the respective ends of a different secondary coil and each said insert having an electrical connector portion;

aligned apertures extending through both of said housing parts and through the respective loop magnetic cores therein;

bus bars extending through said apertures and said loop magnetic cores, respectively, and serving as one-turn primary windings for the transformer;

and means rigidly securing said housing parts together to enclose said coil-core combinations and portions of said inserts with the electrical connector portions of said inserts being accessible from the outside for connection to an external device.

4,013,986

INDUCTIVE TRANSDUCER FOR RECTILINEAR OR ROTATIONAL DISPLACEMENT

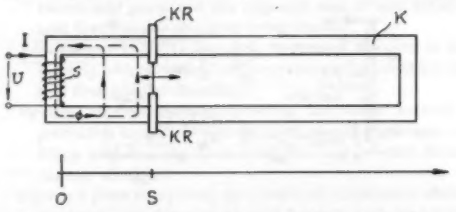
Albert Weckenmann, Oberasbach-Altenberg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed July 23, 1974, Ser. No. 491,180

Claims priority, application Germany, Oct. 22, 1973, 2352851

Int. Cl.² H01F 21/04

U.S. Cl. 336—75 **3 Claims**



1. A transducer for converting a mechanical displacement into an analog electrical output magnitude in accordance with a predetermined function of the displacement of a body, comprising:

an elongated ferromagnetic core having two elongated members joined at at least one end by a transverse core portion and elsewhere separated by an elongated gap free of intermediate ferromagnetic members;

a coil wound on a transverse end portion of said core; and

short-circuiting ring means comprising short circuits respectively encircling individually each of said two elongated members at substantially the same distance from said end portion of said core, mechanically constituted as a single unit, and displaceably mounted for movement in the direction of elongation of said members relative to said core with a conductive part of said ring means always passing completely through said gap and thereby completing said short circuits, for varying the inductance of said coil in response to displacement of said ring means.

4,013,987

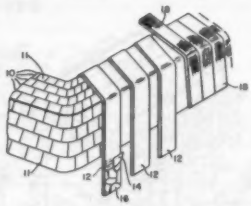
MICA TAPE BINDER

Newton C. Foster, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 22, 1975, Ser. No. 607,007

Int. Cl.² H01F 27/32; B32B 19/00

U.S. Cl. 336—206 **10 Claims**



1. A flexible, non-tacky, fully loaded, preimpregnated tape, for electrical conductors used in high voltage devices, comprises at least one layer of a micaceous material impregnated with about 20 to 35 wt.% of a resinous admixture, capable of forming an infusible thermoset insulation consisting essentially of: (1) 45 to 55 parts by weight of an epoxy resin having an epoxy equivalent weight of between about 170 to 210; (2) 45 to 55 parts by weight of an epoxy resin having an epoxy equivalent weight of between about 215 to 300 and (3) about 7 to 11 parts of zinc 2-ethyl hexonate as a latent catalyst per 100 parts of total epoxy resin; said admixture preheated up to 140° C before impregnation.

6. A flexible, non-tacky tape, for electrical conductors used in high voltage devices, comprises at least one layer of a micaceous material impregnated with about 3 to 15 wt.% of a resinous admixture consisting essentially of: (1) an epoxy resin having an epoxy equivalent weight of between about 215 to 300 and (2) about 7 to 11 parts of zinc 2-ethyl hexonate as a latent catalyst per 100 parts of epoxy resin.

4,013,988

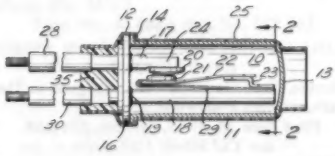
HERMETICALLY SEALED MOTOR PROTECTOR

Ronald L. Holden, Mansfield, Ohio, assignor to Therm-O-Disc Incorporated, Mansfield, Ohio

Filed Jan. 19, 1976, Ser. No. 650,117

Int. Cl.² H01H 51/34

U.S. Cl. 337—89 **17 Claims**

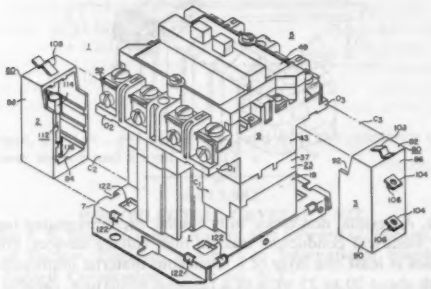


1. A motor protector comprising a housing assembly defining a hermetically sealed switch chamber, a pair of substantially straight and parallel support pins extending into said chamber, said support pins being electrically isolated from each other, a bimetal snap assembly cantilever mounted by welding to one support element, said bimetal snap assembly including a movable contact mounted on the free end thereof, a fixed contact welded to the other support pin, said bimetal assembly operating in response to predetermined bimetal temperatures to move said movable contact along a line of action into and out of engagement with said fixed contact, a reference plane containing said line of action and being substantially parallel to and spaced from the axes of said support pins, the weld between one said support pin and said bimetal snap assembly being spaced from and on one side of said reference plane, and the weld between said fixed contact and said other support pin being spaced from and on the other side of said reference plane.

4,013,989
FUSIBLE ELECTRIC CONTROL DEVICE

William F. Born, Beaver, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1975, Ser. No. 561,726
Int. Cl.² H01H 85/14
U.S. Cl. 337—227 7 Claims



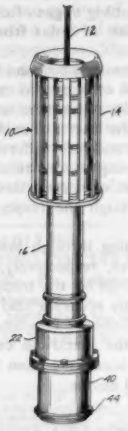
1. An electric control device, comprising:
a first insulating housing having a length, a width, a height, and at least one cavity;
a control mechanism comprising a plurality of contacts, a movable member for operating said contacts between open and closed operating positions, an electromagnet, and means for energizing said electromagnet; energization of said electromagnet causing said movable member to operate said contacts from one to the other of said operating positions; the path of movement of said movable member extending into said at least one cavity; and
at least one fuse assembly comprising a second insulating housing, means within said second insulating housing for engaging a fuse, and terminal means associated with said engaging means for electrically connecting a fuse to apparatus to be protected; said fuse assemblies being removably disposed within said cavities to occupy a volume substantially within the confines of said length, width and height of said first housing, said second insulating housing comprising means defining a cutout preventing interference with the path of movement of said movable member.

4,013,990
BELLOWS CAGING MECHANISM FOR AIRBORNE HYDROPHONE

John A. Devine, Granada Hills, Calif., assignor to The Bendix Corporation, North Hollywood, Calif.

Filed June 30, 1975, Ser. No. 591,268
Int. Cl.² H04R 1/22, 1/44
U.S. Cl. 340—3 T 8 Claims

1. In a sonar system wherein a transducer is suspended into a body of water and returned therefrom, said transducer including an assembly of piezoelectric hydrophones and projector elements, said elements projecting sonar signals and said hydrophone receiving echo signals over a desired high frequency range and wherein a low frequency hydrophone assembly is included, said low frequency hydrophone assembly comprising
a sealed housing attached to said assembly including an electronics package
a chamber including a support plate and means attaching said support plate to said housing and a bellows fastened to said support plate,
a low frequency hydrophone in said chamber having electrical connections to said electronics package and mechanical connectors to said sealed housing, said mechanical connectors including a plurality of compliant suspension members wherein, in air, said bellows is expanded thereby firmly securing said hydrophone between said bellows and said sealed housing and when said bellows is

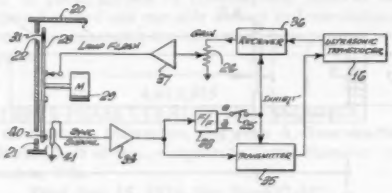


exposed to water pressure at a predetermined depth it is collapsed, leaving said hydrophone suspended in said chamber on said compliant suspension members.

4,013,991
FISH LOCATOR

Orville R. Balcom, Lomita, Calif., assignor to Cetec Corporation, Santa Ana, Calif.

Filed Feb. 13, 1976, Ser. No. 657,731
Int. Cl.² G01S 9/70
U.S. Cl. 340—3 C 3 Claims

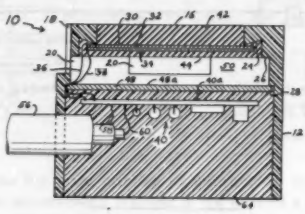


1. In an ultrasonic depth indicator for locating fish and the like, the combination of:
an ultrasonic transducer;
a transmitter for providing an electrical input to said transducer;
a receiver for the electrical output of said transducer;
an indicator;
drive means for rotating said indicator;
means for connecting said receiver output to said indicator for pulsing said indicator as a function of receiver outputs;
synchronization means for generating a transmitter trigger signal in synchronism with indicator rotation providing a trigger signal for every revolution;
a logic circuit having said trigger signal as an input and producing an inhibit signal as an output for predetermined input signals; and
means for connecting said inhibit signal to said transmitter and receiver for inhibiting operation thereof.

4,013,992
DIVER'S PIEZOELECTRIC MICROPHONE WITH INTEGRAL AGC PREAMPLIFIER

Larry F. Dewberry; Robert H. Banks, and Clell A. Dildy, all of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 653,186
Int. Cl.[2] H04B 13/00
U.S. Cl. 340—10 2 Claims



1. A piezoelectric microphone for use in association with diving equipment of a type having molded rubber microphone support means having a recess for holding said microphone in a position for impingement thereon of sound waves, said microphone comprising:

a tubular housing having a generally cylindrical sidewall formed of a rigid electrically insulating material and having a plurality of ports extending therethrough at a predetermined distance from one end thereof, said housing being characterized by a plurality of relieved zones each extending from said one end to a corresponding one of said ports so as to provide air passages between said side wall and said microphone support means, and further characterized by a first internal annular shoulder between said one end and said ports, a second internal annular shoulder coplanar with the edges of said ports adjacent said one end, and a third internal annular shoulder between said ports and the opposite end of said housing, said first annular shoulder being conical;

a piezoelectric crystal bimorph diaphragm disposed in said housing with peripheral portions making line contact with said first annular shoulder;

flexible, elastomeric waterproofing compound formed in protective layers on opposite sides of said diaphragm and filling said housing from said one end to said second annular shoulder;

a ground plate comprising an electrically conductive shielding layer and disposed in said housing with peripheral portions engaging said third annular shoulder, said ground plate and diaphragm defining an airspace therebetween that is adapted by said ports and said relieved zones for communication with pressures within said diving apparatus;

automatic gain control preamplifier means, electrically connected to said diaphragm and disposed in a cavity defined in said housing between said ground plate and said opposite end of said housing, for gain controlled amplification of electrical signals generated by said diaphragm in response to said impingement by said sound waves;

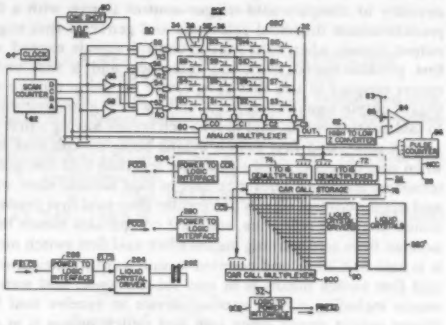
an electrical power and signal transmitting cable extending into said cavity and connected to said automatic gain control preamplifier means; and

waterproof potting compound filling the remainder of said cavity around said automatic gain control preamplifier means.

4,013,993
ELEVATOR SYSTEM

Alan F. Mandel, Pittsburgh, Pa.; Theodore E. Frask, Wayne, N.J., and Denis E. Bedel, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 22, 1976, Ser. No. 669,014
Int. Cl.[2] G02F 1/13; G08B 5/36
U.S. Cl. 340—19 R 11 Claims



1. An elevator system, comprising:

an elevator car mounted for movement in a building to serve the floors therein,

a car station in said elevator car including call means for indicating requests for elevator service,

a normally energized light source in said car station associated with said call means,

a first source of electrical power for said light source,

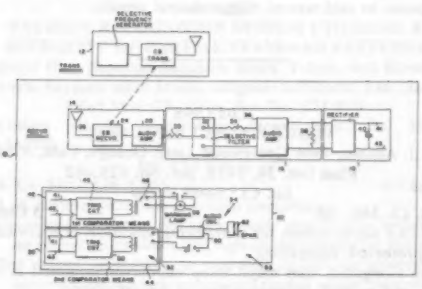
an emergency source of electrical power connected to energize said light source upon failure of said first source of electrical power,

and means associated with said car station which enables light from said light source to provide emergency lighting for said elevator car.

4,013,994
VEHICLE WARNING SYSTEM

Anthony Ragano, 806 S. Westshore Blvd., Tampa, Fla. 33609, and Steven A. Barton, 3315 31st Ave. North, Apt. 215, St. Petersburg, Fla. 33713

Filed Dec. 5, 1974, Ser. No. 529,815
Int. Cl.[2] G08B 3/10
U.S. Cl. 340—33 11 Claims



1. A vehicular warning system for use in combination with a remote transmitter to provide a positive warning signal when the relative distance therebetween reaches a predetermined minimum range, said vehicular warning system comprises a receiver means including circuitry to receive incoming signals from the remote transmitter, a decoder means coupled to said receiver means to receive said incoming signals therefrom.

said decoder means including circuitry to decode said incoming signals of a predetermined wave form and generate decoder output signals in response thereto, a rectifier means coupled to said decoder means to receive said decoder output signals therefrom, said rectified means including circuitry to rectify said output signals and generate trigger control signals in response thereto, a control means coupled to said rectifier means to receive said trigger control signals therefrom, said control means including a first comparator means having circuitry to compare said trigger control signals with a first predetermined threshold reference and generate first trigger output signals when said trigger control signals exceed said first predetermined threshold reference and a first switch means coupled to said first comparator means to receive said trigger output signals therefrom, and a warning means coupled to said control means, said first switch means having a first and second state, said first switch means being in said first state when said trigger control signals are less than said first predetermined threshold reference and in said second state when said trigger control signals are greater than said first predetermined threshold reference, said first comparator means being isolated from said warning means when said first switch means is in said first state, and coupled to said warning means when said first switch means is in said second state, said warning means including a first warning device to receive said first trigger output signals when said first switch means is in said second state, said first warning device including circuitry to generate a first warning signal in response to said first trigger output signal; said control means further includes a second comparator means having circuitry to compare said trigger control signals with a second predetermined threshold reference and generate a second trigger output signal when said trigger control signal exceeds said second predetermined threshold reference and a second switch means coupled to said second comparator means to receive said second trigger output signals therefrom, said second predetermined threshold reference being greater than said first predetermined threshold reference, and wherein said warning means further includes a second switch means including a first and second state, said second switch means being in said first state said trigger control signals are less than said second predetermined threshold reference and in said second state when said trigger control signals are greater than said second predetermined threshold reference, said second comparator means being isolated from said warning means when said second switch means is in said first state and coupled to said warning means when said second switch means is in said second state, said warning means further including a second warning device to receive said second trigger output signals when said second switch means is in said second position said second warning including circuitry to generate a second warning signal in response to said second trigger output signals.

4,013,995

VEHICLE BURGLAR ALARM

Joe J. Adamo, 7306 Grovewood Lane, Orange, Calif. 92669

Filed Oct. 24, 1975, Ser. No. 625,402
Int. Cl.² B60R *25/10*
U.S. Cl. 340—65 **3 Claims**

1. An alarm system for monitoring vibration of a device to be protected, comprising:

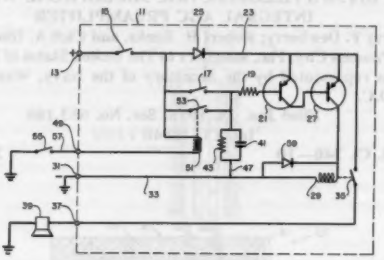
an elongated, thin metal strap cantilever mounted at one end on said device and free at the other end;

a contact plate mounted on said device adjacent said free end of said metal strap and spaced from said free end by a gap;

a signaling device connected to said strap and said plate and activated by contact therebetween;

electronic amplifier means for activating a signaling mechanism for a predetermined period of time in response to a single contact between said strap and said plate, and

means for extending said predetermined period of time in



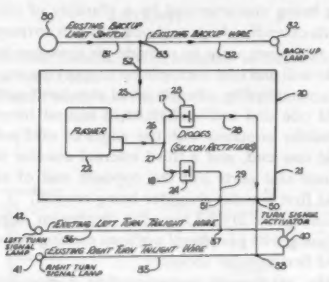
response to each successive contact between said strap and said plate.

4,013,996

BACKUP WARNING DEVICE

Wynant D. Hubbard, 3004 Willow Lane, Thousand Oaks, Calif. 91360

Filed Sept. 25, 1975, Ser. No. 616,829
Int. Cl.² B60Q *1/22*
U.S. Cl. 340—70 **2 Claims**



1. An electrical signal processing system for a vehicle having a back-up lamp and a right and left turn signal lamp, where means is provided in said vehicle for generating constant voltage on a back-up line during backing of said vehicle and an impulsed signal selectively on either a right or left turn signal line during turning of said vehicle, said back-up line coupled to said back-up lamp and said right and left turn signal lines coupled to said right and left turn signal lamps respectively; comprising:

a. pulsing means electrically coupled to said back-up line;

b. a first electrical directional limiting means electrically coupled to said pulsing means and to said right turn signal line for permitting current flow only from said pulsing means to said right turn signal line;

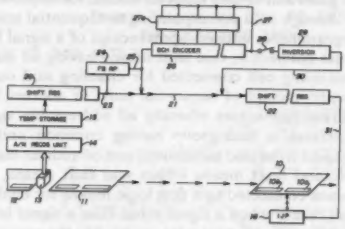
c. a second electrical directional limiting means, electrically coupled to said pulsing means and to said left turn signal line; for permitting energy flow only from said pulsing means to said left turn signal line and for maintaining electrical isolation between said right and left turn signal lines;

Whereby said right and left turn signal lamps will flash when said vehicle is backing and will otherwise operate normally.

4,013,997
ERROR DETECTION/CORRECTION SYSTEM

Stephen Smith Treadwell, III, Dallas, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Nov. 17, 1975, Ser. No. 632,576
Int. Cl.² G06F *11/12*; G06K *5/00*
U.S. Cl. 340—146.1 AL **7 Claims**



1. In the bar code printing of information on documents subject to uncontrolled printing in the area of a bar encoded data field, the combination which comprises:

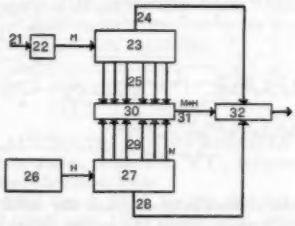
a. BCH encoding means for adding a variable BCH code with the length of the code depending on the size of the document to said information to be printed as a bar code on said document; and

b. means in electrical communication with said BCH encoding means for dynamically and selectively altering said BCH code to accommodate a plurality of information field lengths at least as frequently as the information field rate.

4,013,998
SYSTEM TO RENDER CONSTANT THE PROBABILITY OF FALSE ALARM IN RADAR SIGNALS CONVERTED INTO NUMERICAL FORM

Tullio Bucciarelli, Piazza Tarquinia, 2, 00183 - Rome, and Giovanni Picardi, Via Nicola Festa, 12, 00137 - Rome, both of Italy

Filed Nov. 29, 1974, Ser. No. 528,006
Claims priority, application Italy, Nov. 30, 1973, 54005/73
Int. Cl.² H04B *1/10*; G06F *7/02*
U.S. Cl. 340—146.2 **3 Claims**



1. Apparatus for obtaining constant false alarm probability in radar signals comprising:

means to transform analog video signals into M bit digital signals;

a first digital delay block comprising M digital delay lines connected to receive said digital signals and having a central M-bit output and N lateral outputs of M-bits,

means for generating a and H-bit binary noise signal;

a second digital delay block comprising H digital delay lines for receiving said binary noise signal and having a central H-bit output and N lateral outputs, each one comprising H-bits;

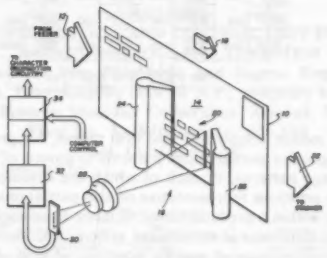
computing means for generating a signal word corresponding to the value of the M+H bits by processing the N-lateral outputs of the first digital delay line block and by processing the N-lateral outputs from the second digital delay line block; and

comparator means connected to receive the output signal from said computing means and the signals from the central bit outputs of said first digital delay block and said second digital delay block for generating a quantized video signal.

4,013,999
SINGLE READ STATION ACQUISITION FOR CHARACTER RECOGNITION

Jerry D. Erwin, Dallas; Dale R. Duvall, Fort Worth, and Richard K. Habitzreiter, Dallas, all of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 497,703, Aug. 15, 1974. This application Dec. 15, 1975, Ser. No. 640,750
Int. Cl.² G06K *9/12*
U.S. Cl. 340—146.3 H **8 Claims**



1. A single read station acquisition system for character recognition of multiline data using a self-scan photocell array as the reading station, said system including: means for reading and temporarily strong multiple lines simultaneously, means for compressing the read data into search segments to evaluate the top and bottom positions of character line, means for determining line linkage between the elements of one search segment of compressed data and the elements of the preceding search segment for future processing, line tracker means for extracting character lines from a temporary storage for transmission to a line block memory, and means for transmitting the data in the line block memory to a character recognition unit.

4,014,000
PATTERN RECOGNITION SYSTEM UTILIZING A PLURALITY OF PARTIAL STANDARD PATTERNS

Takeshi Uno, Sayama; Sadahiro Ikeda, Tokyo, and Hirotada Ueda, Sayama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 29, 1976, Ser. No. 671,048
Claims priority, application Japan, Mar. 28, 1975, 50-36758
Int. Cl.² G06K *9/08*
U.S. Cl. 340—146.3 MA **9 Claims**

1. A pattern recognition system comprising:

image pickup means for sequentially scanning an image of an object to produce first signals representative thereof;

first means, responsive to said first signals, for generating second signals representative of partial image patterns of a two-dimensional pattern of said object as sequentially scanned by said image pickup means;

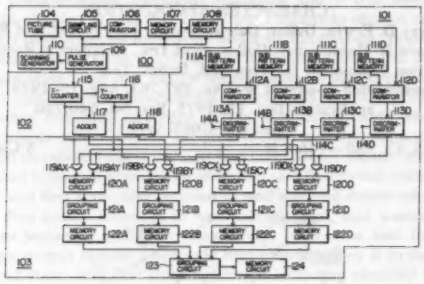
second means for forming a plurality of two dimensional substandard patterns, each of which approximately corresponds to selected portion of the two-dimensional pattern of said object;

third means, responsive to the scan of said object by said image pickup means, for generating third signals repre-

sentive of the respective sequential positions of said partial image patterns;

fourth means, coupled to said first means and said second means, for comparing said each partial image pattern with said respective substandard patterns, and for extracting said each partial image pattern which is within a predetermined degree of coincidence with said substandard pattern;

fifth means, coupled to said third means, for storing positions representative of said respective partial image patterns in response to the outputs of said fourth means; and



sixth means, coupled to said fifth means, for grouping said respective partial image patterns to groups of said partial image patterns, in each of which the distances between the positions representative of said partial image patterns are within a predetermined distance from each other in a two-dimensional coordinate system, and for calculating the coordinate of specific positions of said object in the two-dimensional coordinate system from the groups of said partial image patterns.

4,014,001

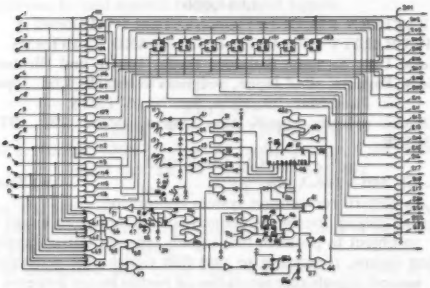
ADDRESSABLE SIGNALLING APPARATUS HAVING MASTER CALLING FEATURE WITH OUTPUT LATCHES AND WRONG DIGIT REJECT

Donald A. Bradley, Milpitas, Calif., assignor to Speedcall Corporation, Hayward, Calif.

Continuation of Ser. No. 519,630, Oct. 31, 1974. This application Dec. 22, 1975, Ser. No. 643,234

Int. Cl.[2] H04Q *9/00*

U.S. Cl. 340—147 MD **6 Claims**



1. An addressable signalling apparatus in a group of similar apparatus having a multiple unit address comprising,

a plurality of input terminals, each terminal corresponding to one address unit of a set of address units,

programmable address connectors, each address connector connected to one of said input terminals in a preselected address program,

a series of OR gates, having inputs and an output, each of said OR gates having as one input different ones of said address connectors representing unique units of address and all of said OR gates having a second input a designated one of said address connectors representing a substituted unit of address,

an output means for signalling,

a multi-cell shift means connected to said output means, to said OR gates and to said input terminals, for sequentially shifting through cells corresponding to sequential units of said programmable address upon receipt of a signal from an address connector, said shift means having an output means enabling cell connected for enabling said output means upon receipt of sequential units of address from said address connectors whereby all addressable signalling apparatus in said group having common units of address apart from said substituted unit of address may be signalled, and reset means within said shift means, said reset means connected to a first logic means for enabling said reset means when a signal other than a signal in one of said address connectors is transmitted to the apparatus.

4,014,002

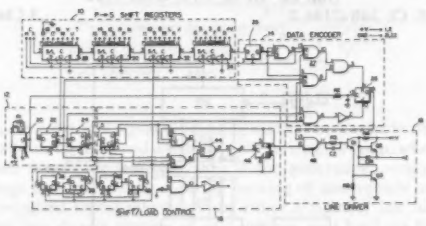
DATA ACQUISITION AND TRANSFER SYSTEM

John F. Tucker, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 5, 1976, Ser. No. 673,830

Int. Cl.[2] H04L *7/00*; **H03K** *7/08*, *9/08*; **H04Q** *9/00*

U.S. Cl. 340—168 B **9 Claims**



1. A data communication system for serially transferring binary data between a first and second location comprising:

a. parallel to serial shift registers for receiving data in parallel form,

b. timing control circuit means for generating a sequence of timing signals,

c. data encoder circuit means coupled to the output of said parallel to serial shift registers and to said timing control circuit means for encoding data as a binary zero if the transition from a low to a high to a low is one clock pulse width in time and a binary one if the transition from a low to a high to a low is three clock pulse width in time,

d. receiver circuit means for receiving said encoded data and having start pulse detector means for detecting the beginning of a data word and information detector means for detecting the presence of data.

4,014,003
CIRCUIT FOR CONTROLLING A SEMI-CONDUCTOR VALVE

Oskar Beckmann, St. Polten, Austria, assignor to Siemens Aktiengesellschaft, Munich, Germany

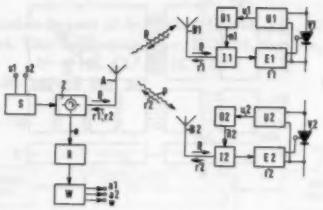
Filed Dec. 5, 1974, Ser. No. 529,925

Claims priority, application Germany, Dec. 5, 1973, 2360670

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² G08B *23/00*

U.S. Cl. 340—171 R **13 Claims**



1. In apparatus for the wireless transmission of a control signal to the control path of a controllable semiconductor valve said apparatus including a high frequency transmitter including means for generating a carrier and means to modulate the carrier by the control signal to form a modulated signal and an antenna connected to said transmitter for radiating said modulated signal, and a high frequency receiver coupled to an antenna for receiving said modulated signal, said receiver including means for demodulating said signal and feeding the demodulated control signal to the control path of the semiconductor valve, the improvement comprising:

a. means coupled to the semiconductor valve providing an output state signal representing the state of said semiconductor valve;

b. a controllable reflecting modulation means terminating the antenna of the high frequency receiver, having a control input coupled to said means providing a state signal, for remodulating a portion of the received transmission and reflecting it as a return signal over said receiver antenna;

c. a modulation dependent signal filter coupled to the antenna of the high frequency transmitter providing said return signal as an output; and

d. a return signal receiver coupled to the output of said modulation dependent signal filter.

4,014,004
AUTOMATIC REPORT REGISTER

Robert Melvin Fuller, Rochester, N.Y., assignor to Harris Corporation, Cleveland, Ohio

Filed Aug. 4, 1975, Ser. No. 601,561

Int. Cl.² G06F *1/00, 15/48;* **H04Q** *9/00;* **H04B** *1/38*

U.S. Cl. 340—172.5 **19 Claims**

1. A report register for use with a mobile unit for automatically transmitting data to a distant station via a radio in response to an interrogation signal from the distant station, comprising:

input switch means for accepting input data to be stored;

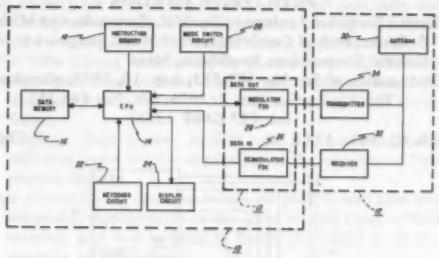
means for storing data;

means for displaying data;

switch means having a plurality of record data positions and at least one transmit data position;

means responsive to said switch means in said record data positions for applying input signals received from said input switch means to said storage means;

means responsive to said switch means in said record positions for applying data stored in said storage means to said displaying means, and



means responsive to an interrogation signal and said switch means in said transmit position for outpulsing the data stored in said storage means to the radio for transmission.

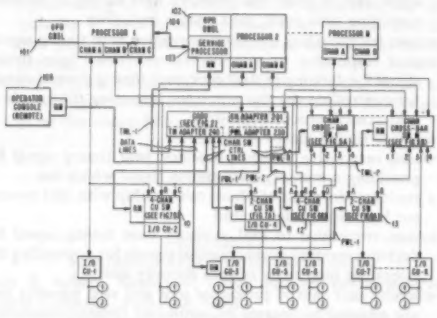
4,014,005
CONFIGURATION AND CONTROL UNIT FOR A HETEROGENEOUS MULTI-SYSTEM

Joel Lawrence Fox, Rhinebeck, and Eugene Everett Marquardt, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 5, 1976, Ser. No. 646,698

Int. Cl.² G06F *1/00*

U.S. Cl. 340—172.5 **5 Claims**



1. A system configuration and control unit (CACU) for a combination of: one or more CPU's, a plurality of I/O devices and/or device switches, and one or more operator stations; each CPU having one or more data channels; the CACU being capable of configuring one or more data channels; the CACU being capable of configuring one or more data processing systems (DPS) from the one or more CPU's, the channels, the I/O devices and/or the device switches, and the one or more operator stations, the CACU comprising:

a random access storage unit having a first location for storing a first bit pattern for a current configuration of the DPS and having a second location for storing a second bit pattern for a next configuration of the DPS,

a processor unit coupled to the random access storage unit,

a configuration storage unit containing a plurality of persistent bistable devices, and a write/readout unit connecting the persistent bistable devices to the processor unit,

channel adapter means for connecting the processor to each CPU includable in the DPS through a respective channel, and

means for transmitting the state of a subgroup of the persistent bistable elements in the configuration storage unit to a respective I/O device or device switch in order to control the connections of the respective I/O devices or device switches into the data processing system.

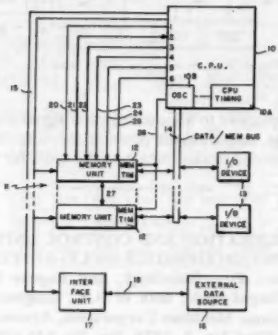
4,014,006
DATA PROCESSING SYSTEM HAVING A UNIQUE CPU AND MEMORY TUNING RELATIONSHIP AND DATA PATH CONFIGURATION

Karsten Sorensen, Lexington; David H. Bernstein, and Michael B. Druke, both of Cambridge, all of Mass., assignors to Data General Corporation, Southboro, Mass.

Continuation of Ser. No. 387,523, Aug. 10, 1973, abandoned. This application Jan. 2, 1976, Ser. No. 646,351

Int. Cl.² G06F *13/00*

U.S. Cl. 340—172.5 7 Claims



1. A data processing system comprising

a central processor unit having a processor operating time cycle and at least one memory unit having a memory operating time cycle, said system including

means for providing a central processor base timing signal;

means responsive to said central processor base timing signal for deriving central processor timing control signals for controlling the the processor operating time cycle of said central processor unit;

memory timing means including

means responsive to said processor base timing signal for providing a memory base timing signal which has

a predetermined out-of-phase relationship with said processor base timing signal; and

means responsive to said memory base timing signal for deriving memory timing control signals for controlling the operating time cycle of said memory unit;

whereby said central processor unit and said memory unit are adapted to operate in controlled timing relationship with each other independently of the duration of the memory operating time cycle of said memory unit.

4,014,007
CIRCUIT ARRANGEMENT FOR PLACING INFORMATION IN A PROGRAMMABLE ECL READ ONLY MEMORY

Ingo Groeger, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 23, 1976, Ser. No. 651,767

Claims priority, application Germany, Feb. 7, 1975, 2502285

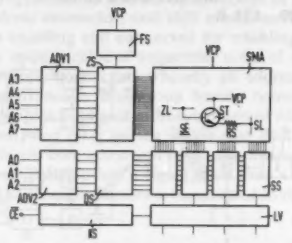
Int. Cl.² G11C *11/40, 17/00*

U.S. Cl. 340—173 R 6 Claims

1. In a programmable read-only memory of the type having a matrix of intersecting column and row lines with a respective storage cell at and connecting the lines at the individual intersections, each storage cell having a circuit element connected to one of the lines and a current interruptable resistor connecting the circuit element to the other of the lines, column selection means for selecting column lines, and row switches connected to the row lines for selecting rows in response to address signals, each row switch comprising a differential amplifier having parallel connected control transistors controlled by the address signals and a reference transistor, and an emitter follower connecting the collectors of the control transistors to the respective row line, the improvement therein comprising:

an input for connection to a switched voltage source to receive a first voltage during a reading operation and a second voltage during an information input operation; and

switch means for each row switch including a current path



connected between said input and the associated row line and a control input connected to the reference transistor of the differential amplifier, said switch means operated by said row switch upon selection of the associated row line and ineffective with respect to the row line when said input receives the first voltage and effective when said input receives the second voltage to support a current flow which is necessary for interrupting the storage cell resistors assigned to the associated row line and to selected column lines.

4,014,008
CIRCUIT ARRANGEMENT FOR INTERFERENCE-FREE STORAGE OF INFORMATION IN A PROGRAMMABLE READ-ONLY MEMORY

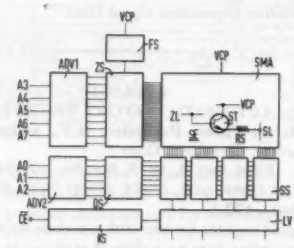
Ingo Groeger, and Juergen Scharbert, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jan. 23, 1976, Ser. No. 651,915

Claims priority, application Germany, Feb. 7, 1975, 2505300

Int. Cl.² G11C *11/40, 17/00*

U.S. Cl. 340—173 R 3 Claims



1. In a programmable read only memory of the type in which a storage cell is located at the intersections of column lines and row lines and each storage cell includes a circuit element and a resistance which is interrupted in response to a predetermined current therethrough, which current is large with respect to a reading current through the resistance, and in which the storage cells are selected for writing by the application of signals to the appertaining row and column lines, the improvement therein comprising:

a regulating transistor connected to each respective column

line, said transistor having an emitter connected to the respective column line, a collector connected to a first reference potential, and a base connected to a second reference potential having a value selected to activate said transistor only if the voltage on the column line falls below a predetermined value during an interruption operation.

4,014,009

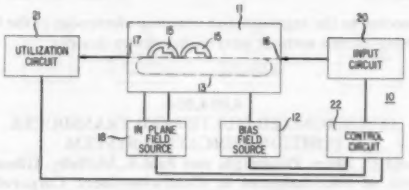
MAGNETIC BUBBLE PROPAGATE ARRANGEMENT

Peter Istvan Bonyhard, Edison; Yu-Ssu Chen, New Providence, and James Lanson Smith, Bedminster, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 541,884, Jan. 17, 1975, abandoned. This application Nov. 5, 1975, Ser. No. 629,007

Int. Cl.² G11C *11/14*

U.S. Cl. 340—174 T F **11 Claims**



7. A magnetic bubble arrangement comprising a first layer of material in which single wall domains can be moved and means coupled to said layer for defining a pattern of asymmetric half-disc elements aligned along an axis of movement in said layer and responsive to a magnetic field reorienting in the plane of said layer for moving domains along said axis.

4,014,010

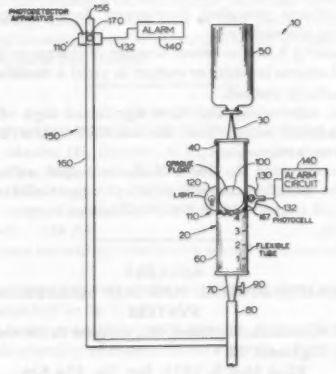
FLUID-DISPENSING APPARATUS HAVING LEVEL CONTROL AND ALARM MEANS

Walter Joseph Jinotti, 10 Scott St., New Brunswick, N.J. 08901

Filed Aug. 1, 1975, Ser. No. 601,147

Int. Cl.² G08B *21/00*

U.S. Cl. 340—244 A **6 Claims**



1. Liquid level sensing and alarm apparatus comprising

a container of fluid to be dispensed disposed generally vertically and having an outlet, through which fluid can flow,

a deformable tube disposed generally vertically and having an inlet at its upper end and an outlet at its lower end,

said inlet at said upper end of said tube being coupled directly, and in open communication, to said outlet of said container,

an outlet pipe connected to said outlet of said tube and having valve means for opening and closing said outlet pipe to fluid flow from said tube and said container,

said tube having indicia display means denoting different final quantities of fluid therein and different times for dispensing such different final quantities of fluids therefrom,

an opaque float present in said tube and positionable at different levels therein depending on the quantity of fluid present therein,

first photoelectric detector means coupled to said tube and adjustably positionable at the level of said opaque float member and thus settable to detect the upper level of a quantity of fluid therein,

a second side tube connected to said outlet pipe and having a vertical tube portion in which fluid is present when fluid is flowing from said container,

a second opaque float in said second tube through which light will not pass, and

second photoelectric detector means in operative relation with said second tube and said second opaque float for sensing a change in an established liquid level in said second tube,

said deformable tube being deformable so that, with said valve closed, air can be squeezed out of said tube into said container of fluid and then a selected quantity of fluid can flow into said tube from said container to a desired level beneath said opaque member, said desired level representing one of said different final quantities of fluid and representing to an operator of the apparatus, the last quantity of fluid to be dispensed from the tube and the time period for said last quantity of the fluid to be dispensed,

said first photoelectric detector means including means for providing an alarm when said last quantity of fluid begins to be dispensed from said tube.

4,014,011

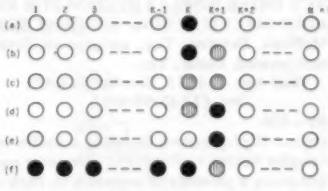
VARIABLE RESOLUTION DISPLAY

Peter B. Ashkin, Sunnyvale, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 25, 1975, Ser. No. 571,874

Int. Cl.² G01D *7/00*

U.S. Cl. 340—324 R **12 Claims**



1. A display comprising:

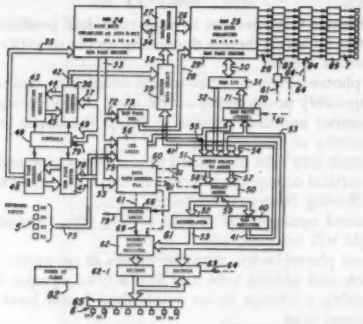
an array having *n* display elements positioned to represent values by their position and light emission, each display element emitting light in response to a driving signal; and

quantizing means coupled to receive an applied signal corresponding to a value to be displayed and coupled to a plurality of the *n* display elements for applying driving signals having variable duty cycles to the plurality of display elements, the duty cycle of each driving signal being responsive to and determined by the value to be displayed.

4,014,012
SEGMENT SCANNING METHOD FOR CALCULATOR DISPLAY SYSTEM

Edward R. Caudel, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 7, 1975, Ser. No. 565,489
Int. Cl.² G09F 9/32
U.S. Cl. 340—336 **9 Claims**



1. A method of actuating a display having a plurality of characters by outputting data in a scanned sequence from data memory means which contains data representing a plurality of characters, wherein the display is of the type having a plurality of segments in each character with all like segments in all characters being electrically connected together and each character position of the display having an electrode common to all segments of that character, comprising the steps of repeatedly actuating the segments in a regular sequence, and for actuation of each segment,

a. comparing in a comparator a representation of the segment currently to be actuated with each of the characters from the data memory means in said scanned sequence, to generate a display signal for each character according to a code when a character contains the segment currently to be actuated,

b. storing a code corresponding to occurrence of the display signals for the segment currently to be actuated,

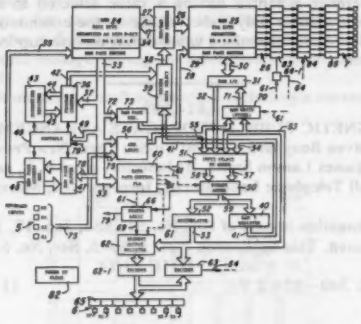
c. and actuating selected ones of said common electrodes according to the stored code.

4,014,013
DIRECT DRIVE DISPLAY SYSTEM FOR MOS INTEGRATED CIRCUITS USING SEGMENT SCANNING

David J. McElroy, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 7, 1975, Ser. No. 566,021
Int. Cl.² G09F 9/32
U.S. Cl. 340—336 **9 Claims**

1. A character display system including a visible light emitting diode display having a plurality of character positions of the type containing a plurality of segments in each character position, all like segments in all character positions being electrically connected together and each character position having an electrode common to all segments of the character position, wherein the improvement comprises an MOS integrated circuit device for actuating the display directly without intervening drivers, the MOS device including segment scan means connected to said segments and generating a repeating sequence of signals for actuating said segments in a regular pattern, and the MOS device also including character actuator means connected to said common electrodes and generating a sequence of signals for selectively actuating combinations of said common electrodes responsive to coded data representing the characters to be displayed, whereby the segment scan means and the character actuator means may be directly

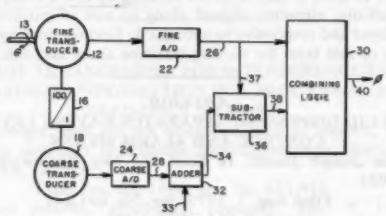


connected to the segments and common electrodes of the light emitting diodes without intervening driver devices.

4,014,014
SYNCHRONIZED MULTISPEED TRANSDUCER POSITION INDICATING SYSTEM

Donald H. Jones, Pittsburgh, and Paul F. McNally, Gibsonia, both of Pa., assignors to Contraves-Goerz Corporation, Pittsburgh, Pa.

Filed June 6, 1975, Ser. No. 584,376
Int. Cl.² H03K 13/02
U.S. Cl. 340—347 SY **11 Claims**



7. A method for synchronizing the digitalized position output of a multispeed system having a coarse transducer and a fine transducer providing overlapped decimal digit output comprising the steps of:

first, adding a first constant number of counts to the digitalized coarse transducer output to yield a modified coarse transducer output;

second, subtracting the most significant digit of the fine transducer output from the modified coarse transducer output; and,

third, combining the fine transducer output with a portion of the modified coarse transducer output obtained in the second step to obtain a nonambiguous output.

4,014,015
ABSOLUTE DIGITAL POSITION MEASUREMENT SYSTEM

Philip M. Gundlach, Highland, Ill., assignor to Devtron Corporation, Highland, Ill.

Filed May 5, 1975, Ser. No. 574,526
Int. Cl.² G08C 9/04
U.S. Cl. 340—347 P **31 Claims**

1. In a linear position measurement system comprising a linear member having a length many times as great as its width and an interacting member, the interacting member being movable lengthwise relative to the linear member, the improvement comprising:

a. permutated code means carried by said linear member for defining absolute positions along its length,

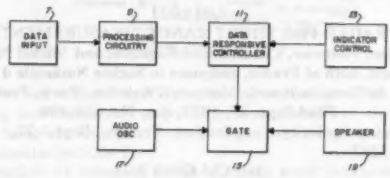
b. means independent of said interacting member for producing an alternating magnetic field along substantially the entire length of said linear member, and

c. means carried by said movable member for coupling with said alternating magnetic field to produce signals in said permutated code means so as to produce absolute position information in said linear member representative of the position of said movable member along said linear member.

4,014,016
AUDIO INDICATING SYSTEM

Jay G. Sherritt, and Joseph A. Eccher, both of Boulder, Colo., assignors to Ball Brothers Research Corporation, Boulder, Colo.

Filed Nov. 29, 1974, Ser. No. 528,120
Int. Cl.² G08C *19/22;* **G08B** *3/10*
U.S. Cl. 340—384 R **26 Claims**



1. An audio indicating system providing a calculator output in audio form by individual digits, said system comprising: input means to receive electrical signals indicative of retrievable information and producing output signals reflective thereof; signal controlling means connected with said input means and receiving said output signals therefrom, said signal controlling means providing a coded output signal the composition of which depends upon said output signal received from said input means; audio means connected with said signal controlling means to receive said coded output signal therefrom, said audio means, in response to received coded output signals from said signal controlling means, providing, for each of said individual digits, a preselected number of audio tones at substantially the same predetermined frequency with the number of said tones being determined by the composition of said coded signal received from said signal processing means; and means for causing a second output from said audio means at a frequency different from that of said predetermined frequency and causing an audio indication of the positioning of a decimal point in said output.

4,014,017
SYSTEM FOR EDITING CHARACTERS

Harry W. Moore, III, Dryden, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Aug. 13, 1975, Ser. No. 604,401
Int. Cl.² G06F *3/14*
U.S. Cl. 340—324 AD **10 Claims**

1. A system for editing characters stored in a memory comprising:

memory means for storing data representative of a plurality of characters to be displayed,

visual means connected to said memory means for displaying said plurality of characters in a matrix of columns and rows,

keyboard control means having a plurality of data entry keys, edit function keys and means for generating addresses designating the address of each of said characters in said memory by columns and rows,

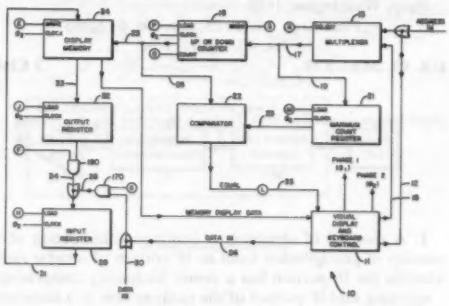
counter means operably connected to said keyboard control means and settable with a first address in said memory means to be edited,

a maximum count register operably connected to said keyboard control means and settable with a last address in said memory means to be edited,

an output register connected to said memory means for receiving and storing characters from said memory means at the address indicated by said counter means,

an input register operably connected to said keyboard control means for receiving and storing edit characters and operably connected to said output register for receiving and storing characters from said memory means, and

comparison means for comparing the address in said counter means with the address in said maximum count

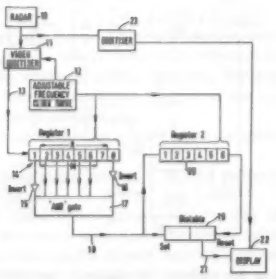


register and for generating a signal indicating the completion of an edit function, whereby the depression of the edit function key initiates an edit function in said keyboard control means which sequentially transfers the character in said memory means designated by said counter means to said output register and said character in said input register to the designated address in said memory means, then transfers the character in said output register to said input register and increments the counter means one count to designate a new address in said memory means to permit the repetition of the edit function until said comparison means generates a signal indicating a comparison has been made.

4,014,018
PULSE RADAR APPARATUS

Philip David Lane Williams, Banstead, and Harry Donald Cramp, New Malden, both of England, assignors to Decca Limited, London, England

Filed July 16, 1975, Ser. No. 596,454
Claims priority, application United Kingdom, Aug. 6, 1974, 34522/74
Int. Cl.² G01S *7/44*
U.S. Cl. 343—5 VQ **15 Claims**



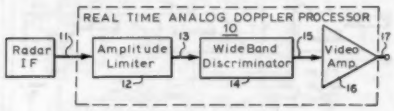
1. In a receiver for pulse radar apparatus utilising transmitted pulses of a predetermined duration and providing received radar signals; the provision of means for sampling the ampli-

tude of the received radar signals at a rate such that there would be a plurality of samples in the time duration corresponding to the transmitted pulse length, and means giving an output only when there are at least M successive samples of at least a predetermined amplitude in N successive samples, when N is greater than M.

4,014,019
REAL TIME ANALOG DOPPLER PROCESSOR FOR WEATHER RADAR

Richard W. Fetter, Warrenville, Ill., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 11, 1975, Ser. No. 612,385
Int. Cl.² G01S 9/60
U.S. Cl. 343—5 W **3 Claims**



1. A method of obtaining a continuous indication of the velocity of precipitation from an IF portion of a radar system wherein the IF portion has a center frequency comprising:

applying said IF portion of the radar system to a discriminator;

detecting instantaneous frequency variations from the center frequency with the discriminator by

a. splitting the IF portion into a first and second signal,

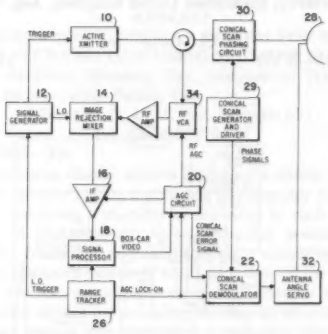
b. delaying said first signal, and

c. applying said second signal and said delayed first signal to a phase detector for providing an output voltage from the discriminator, which voltage is proportional to frequency variations from the center frequency and indicative of the velocity of precipitation.

4,014,020
AUTOMATIC GAIN CONTROL CIRCUIT FOR HIGH RANGE RESOLUTION CORRELATION RADAR

Carl R. Barrett, Jr., Hazelwood, Mo., and Abe Goldstein, Santa Ana, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 13, 1971, Ser. No. 174,577
Int. Cl.² G01S 7/02
U.S. Cl. 343—7 AG **2 Claims**



1. In a high-range resolution, correlation radar system, active mode AGC circuitry comprising:

input means for receiving target gate signals from said system to energize said AGC circuitry, and angle-error, box-car video signals from said system,

said input means including delay means responsive to said video signals when received target amplitude is greater than a selectively predetermined delay;

low-pass filter means connected to the output of said input means;

RF driver and scaling amplifier means connected to the output of said low-pass filter means to provide RF gain control signals at the output thereof;

linearizing circuit means connected to the output of said low-pass filter means;

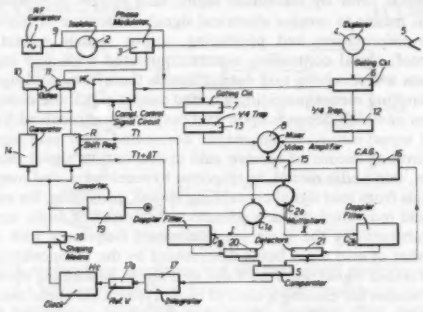
IF driver and scaling amplifier means connected to the output of said linearizing circuit means to provide IF gain control signals at the output thereof and simultaneously with said RF gain control signals; and,

nutation filter means connected to the output of said low-pass filter means for removing angle-error, nutation signals from said video signals.

4,014,021
RADAR FOR SHORT RANGE MEASUREMENTS

Jacques Fournier, Chatillon sur Bagneux, and Michel Nicolas, Paris, both of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed Sept. 25, 1975, Ser. No. 616,680
Claims priority, application France, Sept. 27, 1974, 74.33247
Int. Cl.² G01S 9/23
U.S. Cl. 343—14 **5 Claims**

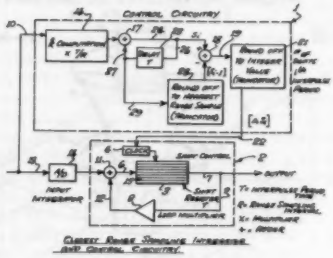


1. A radar installation for measuring distances of the order of several tens of meters by transmitting and receiving signals modulated by sequences of pseudo-random bits, including a transmitter for transmitting said signals, a receiver for receiving the transmitted signals after their reflection on a target, variable frequency clock common to said receiver and said transmitter, means for indicating the radar-target distance, comprising means for measuring the frequency of the clock, a first shift register connected in a closed loop and arranged in the transmission path of the radar installation to modulate the transmitted radar signals, a second shift register having two outputs connected from different stages thereof in order to provide two control signals, one signal having a time delay relative to the other signal, a pair of correlators, means for applying the signals received by said receiver of the radar installation to the inputs of the correlators, connection means for driving the two registers by said variable frequency clock and for controlling each of the correlators by the delayed signals from respective outputs of the second register and subtraction means for subtracting the output signals of one correlator from the output signals of the other correlator to produce a difference signal for controlling the frequency of the clock, which varies in dependence on the distance of the target from the radar installation.

4,014,022
TARGET DETECTION METHOD AND APPARATUS FOR REDUCING RANGE-SMEARING ERROR CAUSED BY RELATIVE TARGET MOTION

Leonard Weinberg, Haddonfield, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 16, 1975, Ser. No. 587,475
Int. Cl.² G01S 9/06
U.S. Cl. 343—13 R **5 Claims**



1. For use with a target detection system adapted for integrating and detectably processing a succession of discrete range samples received as pulsed transmissions during a series of interpulse periods T;

a method of reducing range-smearing error produced by pulse-to-pulse motion of the pulse transmission source relative to the detection system, said method including the steps of:

trackably determining the relative speed of said target

computing the relative pulse-to-pulse speed of said target,

storing in separate cells of a shiftable register a different succession of range sample sums derived by successively adding each of a series of incoming range samples from each range to a sum of previously-received range samples from each range,

controllably shifting said register to align a particular range sample sum with each incoming range sample of said particular range, said alignment control being performed on a pulse-to-pulse basis in accordance with said computed pulse-to-pulse target speed to align each incoming range sample with the stored range sample sums within the closest range,

summing said incoming range sample with said aligned range sample, and

storing said summed incoming range sample in said register for subsequent processing.

4,014,023
BEAM FORMER UTILIZING GEOMETRIC SAMPLING

Robert E. Kirkland, Barrington, R.I., assignor to Raytheon Company, Lexington, Mass.

Filed May 14, 1975, Ser. No. 577,366
Int. Cl.² H01Q 3/26; G01S 3/80; H03K 13/02
U.S. Cl. 343—100 SA **16 Claims**

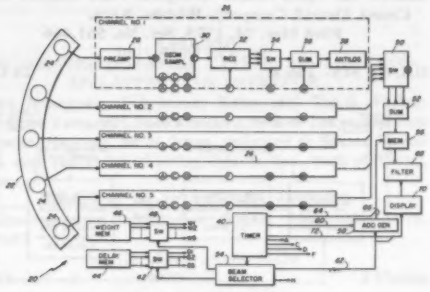
12. In combination:

means for comparing a reference signal to an input signal;

means coupled to said comparing means for designating a sequence of digital numbers in accordance with a sequence of output signals from said comparing means;

decoder means having a plurality of output lines and having its input coupled to said number designating means, said decoder means being responsive to one of said digital numbers for activating only one of its output lines; and

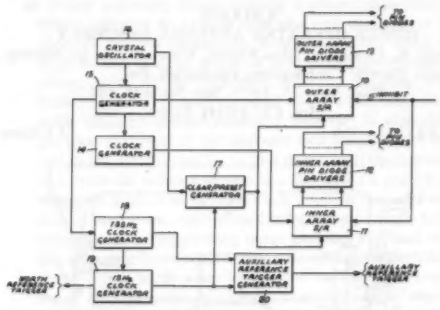
means coupled between said output lines of said decoder means and said comparing means for converting a digital number represented by said output lines of said decoding means to said reference signal, said reference signal being an analog type signal.



4,014,024
NON-ROTATING ANTENNA

Ernest G. Parker, Convent Station, N.J.; Constantino Lucanera, Blauvelt, N.Y., and Richard W. Craine, Nutley, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 15, 1973, Ser. No. 370,488
Int. Cl. G01s 1/46
U.S. Cl. 343—106 R **9 Claims**



1. A method of producing a 135 Hz modulation component by step-wise rotation of a binary current distribution around a cylindrical radiating array of active elements, for superposition on a rotating limacon radiation pattern of the type radiated by Tacan antennas comprising:

generating a first signal having a first current amplitude and first phase;

generating a second signal having a second current amplitude and second phase;

feeding a first predetermined group of a plurality of active elements on said array with said first signal, said group located non-symmetrically around said cylindrical array;

feeding the remainder of said active elements with said second signal; and

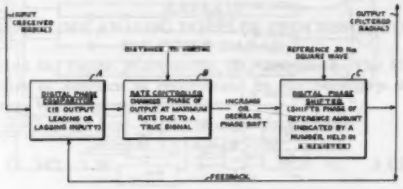
electronically switching said active elements whereby said group is electronically rotated around said cylindrical array.

4,014,025

SCALLOPING SUPPRESSION SYSTEM AND METHOD

Andrew M. Vesel, Mount Arlington, N.J., assignor to The Cessna Aircraft Company, Wichita, Kans.

Filed Mar. 24, 1975, Ser. No. 561,466
Int. Cl.² G01S 1/50
U.S. Cl. 343—106 R 24 Claims


INPUT OBSERVED SIGNALS
OUTPUT (CORRECTED SIGNALS)
DIGITAL PHASE COMPARATOR (IS OUTPUT LEADING OR LAGGING INPUT?)
RATE CONTROLLED CHANGES PHASE OF OUTPUT AT MAXIMUM RATE DUE TO A TRUE SIGNAL
INCREASE OR DECREASE PHASE SHIFT
DIGITAL PHASE SHIFTER (SHIFTS PHASE OF REFERENCE AMOUNT INDICATED BY A NUMBER HELD IN A REGISTER)
REFERENCE 30 Hz SQUARE WAVE
FEEDBACK

1. A scalloping suppression system for use in a bearing determining apparatus wherein the bearing of an object relative to a station is determined by comparing at said object the relative phase of a reference signal and a variable phase signal emitted at said station, comprising

means for deriving from said reference signal a first signal having the same phase as said reference signal and means for deriving from said variable signal a second signal having the same phase as said variable phase signal,

means for causing the phase of said first signal to follow changes in the phase of said second signal,

means for limiting the rate of change of phase of said first signal to the maximum rate which could be due to an actual bearing change between said object and said station,

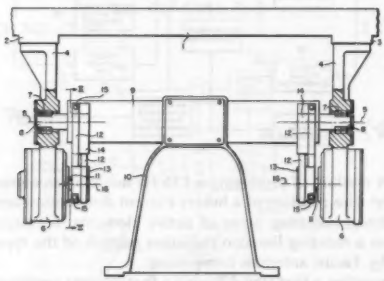
said phase following means including means for separately delaying each cycle of said first signal and means for separately phase comparing each delayed cycle of said first signal with a cycle of second signal.

4,014,026

POWER OPERATED ANTENNA ASSEMBLY

Douglas K. Comstock, Glen Burnie, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 25, 1975, Ser. No. 635,484
Int. Cl.² H01Q 3/06
U.S. Cl. 343—766 3 Claims



1. An antenna assembly comprising, shaft means defining a horizontal axis,

arm means mounted on said shaft means for rocking movement vertically about said horizontal axis, said arm means extending fore and aft of such axis,

an antenna mounted on the forward end of said arm means,

motor means mounted on the rearward end of said arm means, and

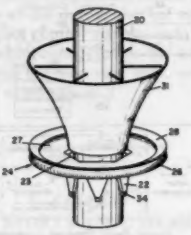
drive means coupling said motor means to said shaft means for effecting the aforesaid rocking movement.

4,014,027

OMNIDIRECTIONAL ANTENNA FOR AROUND A MAST

Michiël Antonius Reinders, Zoetermeer, Netherlands, assignor to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands

Filed Jan. 19, 1976, Ser. No. 650,306
Claims priority, application Netherlands, Jan. 21, 1975, 7500682
Int. Cl.² H01Q 19/14
U.S. Cl. 343—779 3 Claims



1. An omnidirectional antenna surrounding a mast having a uniform diametrical cross-section at all angles comprising:

A. an annular truncated rotation-symmetrical reflector,

B. an annular radiator having an outer circular peripheral edge and an inner polygonal edge adjacent the mast, and

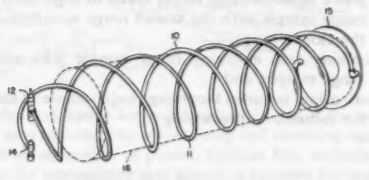
C. a plurality of triangular shaped horns parallel to the axis of said mast feeding the polygonal inner edge of said radiator.

4,014,028

BACKFIRE BIFILAR HELICAL ANTENNA

John A. Cone, Cypress; Robert A. Archer, Torrance; Edward R. Pacheco, Fountain Valley, and Creath E. Peyton, Torrance, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Aug. 11, 1975, Ser. No. 603,429
Int. Cl.² H01Q 1/36
U.S. Cl. 343—895 5 Claims



1. A backfire antenna for radiating or receiving a circularly polarized wave over a predetermined frequency range, said antenna comprising:

a. a first helix having a constant diameter;

b. a second helix having a constant diameter and being wound in the same direction of that of said first helix, each of said helixes having an input terminal, and said helixes being coaxial; and

c. means connected to the input terminal of said first helix and to the input terminal of said second helix for simultaneous transfer of high frequency current to each helix, said currents being of substantially equal magnitudes and substantially 180° out of phase with respect to each other, said helixes having such a diameter and such a pitch that the high frequency currents on adjacent turns of said helixes are out of phase and cancel each other for currents moving from said terminals outwardly, while currents moving towards said terminals at opposite points of said helix are in phase to provide a backfire antenna,

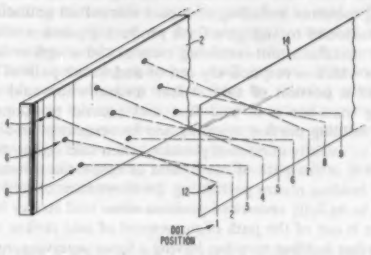
whereby a circularly polarized wave is received or radiated backward from said terminals, the circularly polarized wave having a direction of polarization opposite that of the direction of winding of said helixes.

4,014,029

STAGGERED NOZZLE ARRAY

Ramon Lane, Crompond, and Howard Hyman Taub, Mount Kisco, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,974
Int. Cl.² G01D *15/18*
U.S. Cl. 346—1 **25 Claims**



1. In a jet printer including a nozzle plate having at least two rows of nozzles, with the nozzles in one row being staggered with respect to the nozzles in another row, a method of printing at least a portion of a line at a time on a printing medium, wherein said line is comprised of a plurality of dot positions, said method comprising the steps of:

directing the jets from one row of nozzles towards a selected first group of non-adjacent dot positions on said line on said printing medium; and

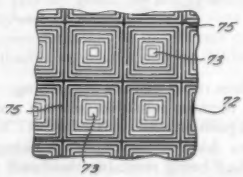
directing the jets from another row of nozzles, in a non-parallel trajectory with respect to the trajectory of the jets from said one row of nozzles, towards a selected second group of non-adjacent dot positions on said line on said printing medium.

4,014,030

HALF-TONE IMAGING WITH FLYING SPOT SCANNER SYSTEM

Howard M. Stark, Webster, N.Y., and William Streifer, Palo Alto, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 23, 1976, Ser. No. 660,092
Int. Cl.² G03G *15/30*
U.S. Cl. 346—160 **11 Claims**



1. A method for imparting half-tone imaging capability to a flying spot scanning system wherein a collimated light beam is modulated in response to a video electrical signal and reflected as a plurality of beams of modulated light sweeping across a photosensitive surface which comprises:

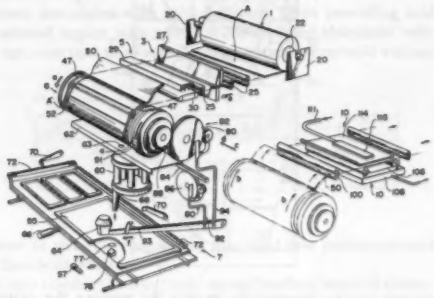
positioning proximate the photoreceptor surface but out of contact therewith a light attenuating member having an optional light transmission characteristic that varies in a continuous and cyclic pattern with a cycle period of at least about 10 times the maximum lateral extent of said light beam.

4,014,031

ELECTROPHOTOGRAPHIC TYPESETTING METHOD AND APPARATUS THEREFOR

Shigeru Hasegawa, Yokohama; Katsuyoshi Takai, Fujimi; Hiroharu Yamazaki; Sueo Kikkawa, both of Tokyo, and Eizo Suyama, Hayama, all of Japan, assignors to Sakata Shokai Ltd. and Tokyo Broadcasting System, Inc., both of Tokyo, Japan

Filed Aug. 29, 1975, Ser. No. 609,041
Claims priority, application Japan, Mar. 28, 1975, 50-37657
Int. Cl.² B41B *13/00, 21/24*
U.S. Cl. 354—5 **2 Claims**



1. An apparatus for making prints comprising:

an electrically charging device for electrically charging a photoconductive material,

a photoconductive material holding device for holding said electrically charged material; and

an image exposing device having a phototypesetting machine adapted to expose said charged material to light through desired characters, numerals and/or other symbols in the original plate of said phototypesetting machine, said photoconductive material holding device including a rotary holding drum about which said electrically charged photoconductive material is disposed in position and held at the opposite side edges of the material in the axial direction of said drum, said photoconductive material holding device also including a pair of endless belts spaced away from each other in the axial direction of said drum, each of said belts being partially trained around the corresponding outer periphery of said drum, the engaging faces of said belts with said outer peripheries being driven at the same rate and in the same direction as those of said outer peripheries of said drum whereby when an electrically charged photoconductive material is fed onto the holding drum, the material is pinched between the rotating drum and holding belts so that the material is held at the opposite side edges thereof on the holding drum.

4,014,032

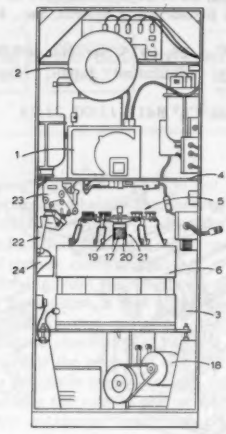
PHOTOGRAPHIC APPARATUS

John Currie, Walton-on-Thames, England, assignor to Photo-Me Limited, Walton-on-Thames, England

Filed Sept. 8, 1975, Ser. No. 611,528
Claims priority, application United Kingdom, Sept. 10, 1974, 39411/74
Int. Cl.² G03B *17/50;* **G03D** *3/04;* **B01F** *13/00*
U.S. Cl. 354—93 **2 Claims**

1. A photographic apparatus comprising a camera, a circular array of open topped processing tanks adapted to contain

processing liquids and arranged beneath the camera, a film carrier disposed beneath the camera and above the array of processing tanks, the said carrier being arranged to receive exposed film from the camera, means for moving the carrier up and down and for rotating it step by step thereby to dip the film carried by the carrier into each tank of the array in turn, an agitator in each tank, each said agitator comprising a vertically disposed operating stem spaced from a tank side, said stem arranged to be moved downwards in the tank when the



carrier moves downwards, means for moving the operating stem upwards when the carrier moves upwards, and a plurality of agitator blades extending transversely of the stem and mounted thereon for limited pivotal movement with respect thereto, with an end of each blade remote from the stem, movably socketed in a transverse groove in said tank side, which blades are movable about their respective connections to the stem and tank side by upward and downward movement of the operating stem thereby to agitate liquid in the tank.

4,014,033

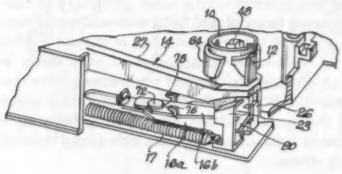
PERCUSSIVE FLASH UNIT OPERATING MECHANISM

Kwok Yan Chan, North Point, Hong Kong, assignor to W. Haking Industries, Ltd., Victoria, Hong Kong

Filed Feb. 11, 1975, Ser. No. 548,904

Int. Cl.[2] G03B *15/04*

U.S. Cl. 354—142 **6 Claims**



1. In a still camera including a housing having shutter means operative to expose film in the housing, manually operable trigger means including a portion exposed to the outside of the camera housing for manual operation for operating the shutter means to effect a picture taking operation, and manually operable shutter resetting means exposed to the outside of the housing for advancing the film and resetting the shutter for operation by said manually operable trigger means, and a flash unit-receiving means exposed to the outside of the camera housing for receiving a flash unit of the percussive type requiring a force against a flash producing portion thereof to effect a flash operation, the improvement comprising striker means mounted for movement, in response to operation of said manually operable shutter resetting means, from an uncocked to a cocked position and including force applying means positioned so as to be able to effect the application of a flash initiating force against a flash producing portion of a unit in said flash unit-receiving means during the movement of said striker means from its cocked to its uncocked position, spring means for urging said striker means from said cocked to said uncocked position, means for releasing said striker means from said cocked position upon operation of said manually operable trigger means unless hindered from being so released, and a striker holding member having first and second positions when a flash unit is respectively inserted into and removed from said flash unit-receiving means, said striker holding member including as a part thereof an actuator portion positioned to engage a flash producing portion of a flash unit in said flash unit-receiving means, and a striker holding portion which is respectively out of and in the path of movement of a portion of said striker means when said striker holding member is in said first and second positions, said striker holding portion stopping any movement of said striker means to its fully uncocked position when said striker holding portion is in the path of movement of said striker means, the striker holding means permitting the movement of said striker means to its fully uncocked position when said striker holding portion is out of the path of movement of said striker means, said striker holding member having a force receiving means in the path of movement of said force applying means when the striker means is permitted to be moved to its fully uncocked position which force applying means then moves said striker holding member into a position where said actuator portion there is capable of contacting the flash producing portion of a flash unit in the flash unit-receiving means.

4,014,034

SINGLE LENS REFLEX CAMERA

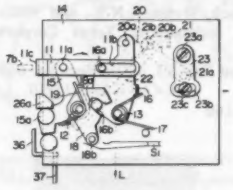
Toshinori Imura, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Japan

Filed Apr. 21, 1975, Ser. No. 569,753

Claims priority, application Japan, Apr. 25, 1974, 49-46013[U]; Apr. 25, 1974, 49-46511[U]; Apr. 25, 1974, 49-46512[U]

Int. Cl.[2] G03B *19/12, 9/02*

U.S. Cl. 354—152 **23 Claims**



1. A single lens reflex camera comprising:

a first drive member movable between a cocked position and a rest position;

a drive-force transmitting member engaging said drive member and being rotatable therewith when said first drive member moves from its cocked position to its rest position;

an actuating member reciprocally movable from a first position to a second position and being engaged by said drive-force transmitting member for effecting such movement of said actuating member;

spring means for causing said actuating member to return from its second position to its first position;

a diaphragm normally biased for movement from an open aperture position to a stopped down position;

a diaphragm drive member operatively coupled with said actuating member and rotatable in association with the movement of said actuating member and, upon movement of said actuating member from its first to its second position, said diaphragm drive member serving to enable said diaphragm, normally biased in a direction for being stopped down, to be stopped down from its open aperture position to a preadjusted diaphragm aperture, and upon return movement of said actuating member, said spring means causing said diaphragm drive member to drive the diaphragm against its normal biasing from its stopped down position to its open position;

a reflecting mirror movable between a viewing position and a picture taking position and biased so as to be normally located in its viewing position;

a reflecting mirror drive member coupled to said reflecting mirror and adapted to be operatively coupled to said actuating member such that upon advancing movement of said actuating member, said mirror drive member drives said reflecting mirror from its viewing position to its picture taking position, and upon return movement of said actuating member, said mirror drive member being disengaged from said actuating member; and

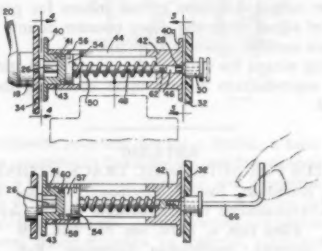
means for disengaging said first drive member from said drive-force transmitting member.

4,014,035

MULTIPLE EXPOSURE CAMERA TAKE-UP SPOOL

Carl Rex Canfield, Jr., 12317 Windsor Drive, Carmel, Ind. 46032

Filed Sept. 23, 1975, Ser. No. 616,080
Int. Cl.² G03B 1/40
U.S. Cl. 354—209 **8 Claims**



1. In a camera of the type having a roll film supply spool and a film take-up spool, a shutter cocking and film advancing mechanism coupled to the film take-up spool, whereby cocking the shutter rotates the film take-up spool to advance the film for the subsequent taking operation, to thereby prevent double exposures, and a movable retainer pin engaging one end of the film take-up spool the improvement comprising, means carried by said take-up spool to prevent rotation of the take-up spool upon actuation of the shutter cocking mechanism, whereby double exposures may be deliberately made.

4,014,036

SINGLE-ELECTRODE CHARGE-COUPLED RANDOM ACCESS MEMORY CELL

Irving T. Ho, Poughkeepsie, and Hwa N. Yu, Yorktown Heights, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Continuation of Ser. No. 159,860, July 6, 1971, abandoned. This application Sept. 24, 1973, Ser. No. 400,481
Int. Cl.² H01L 29/78
U.S. Cl. 357—24 **6 Claims**

1. A charge coupled random access memory array comprising:

a semiconductor body having therein an impurity of a first conductivity type,

a plurality of charge couple memory cells arranged in columns and rows on said body,

bit lines extending in the column direction, each bit line in operative relation to a column of said cells,

word lines extending in the row direction, each word line in operative relation to a row of said cells,

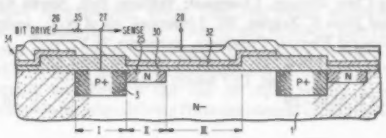
each of said cells comprised of a first region in said semiconductor body having embodied therein an impurity of a second opposite conductivity type, said first region of said cell in operative electrical connection with one of said bit lines,

a second region in said body in adjacent lateral relationship to said first region in the row direction,

a third region in said body in adjacent lateral relationship to said second region, and spaced from said first region by said second region, said third region spaced from the first region of the adjacent memory cell,

a surface layer of dielectric material overlying at least said second region and said third region,

means associated with said dielectric layer providing said second region with a first predetermined threshold voltage, and said third region with a second threshold voltage



less in absolute magnitude than said first predetermined threshold voltage,

a single conductive electrode on said surface layer of dielectric material and extending over said second and third regions in superimposed relation and in operative electrical connection with one of said word lines,

said single electrode having a first portion over said second region of said body, and a second portion over said third region of said body,

a means of applying at least two voltage levels to said conductive electrode to control the storage of charges in, and flow of charges to, said third region, the first of said voltage levels applied to said conductive electrode is of an absolute magnitude less than said first predetermined threshold voltage of said second region, but equal to or greater than said second threshold voltage of said third region, thereby inverting only said third region for charge storage capability,

the second of said voltage levels of an absolute magnitude equal to or greater than said first predetermined threshold voltage of said second region thereby inverting both of said second and third regions for charge flow capability.

4,014,037

SEMICONDUCTOR DEVICE

Takeshi Matsushita, Sagamihara; Hisao Hayashi, Atsugi; Teruaki Aoki, Tokyo; Hisayoshi Yamoto, Hatano, and Yoshiyuki Kawada, Atsugi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

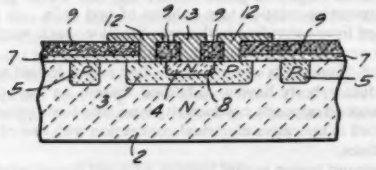
Filed Mar. 24, 1975, Ser. No. 561,532
Claims priority, application Japan, Mar. 30, 1974, 49-36175
Int. Cl.² H01L 29/34
U.S. Cl. 357—52 **5 Claims**

1. A semiconductor device comprising:

a semiconductor single crystal substrate;

a polycrystalline silicon layer containing oxygen in the range of 2 to 45 atomic percent on and in substantially electrical contact with said substrate;

said layer having a predetermined electric property such



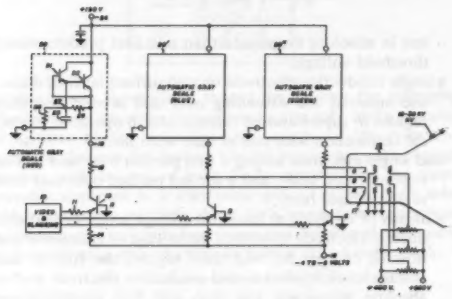
that the surface state of said substrate is substantially unaffected by an electric field across said layer.

4,014,038

AUTOMATIC GRAY SCALE CONTROL CIRCUIT FOR A COLOR TELEVISION RECEIVER

Ying-Chen Hwang, Liverpool; William Peil, North Syracuse, and John F. Zeigler, III, Liverpool, all of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,554
Int. Cl.² H04N 9/535, 3/24
U.S. Cl. 358—29 **16 Claims**



1. In a color television receiver, the combination comprising:

A. a three gun CRT, each gun having a
1. cathode
2. signal grid, and
3. screen grid,

B. three video drivers for said three guns, each driver having
1. video and blanking signals applied thereto, and
2. a load to which the cathode of the associated gun is direct coupled,
3. the impedance between cathode and ground during blanking being selected to cause said CRT to self-bias itself to cut off during vertical blanking at a predetermined small current level,

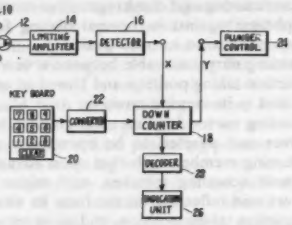
C. three sources of controlled d.c. bias potentials for energizing said three drivers, each source
1. providing a potential substantially equal to the cut-off potential of the associated CRT gun, and
2. comprising:
a. an energy storage circuit including a capacitor,
b. means for charging said capacitor to said cut-off potential during vertical blanking, said energy storage circuit having a time constant adequate to maintain said potential substantially constant between successive vertical blanking pulses, and
c. voltage control means coupled to said energy storage circuit for coupling a bias potential to said driver load equal to said stored cut-off potential during video and for decoupling said bias potential during blanking.

4,014,039

AUTOMATIC PROGRAM LOCATOR FOR TAPE DECKS

Tatsuhiro Yasunaga, Higashihiroshima, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 24, 1975, Ser. No. 571,411
Claims priority, application Japan, Apr. 24, 1974, 49-61056
Int. Cl.² G11B 27/24, 15/18, 15/02
U.S. Cl. 360—72 **10 Claims**



1. An automatic program locating system for tape reproduction systems comprising:

a. a sensing head in physical contact with a tape when the tape reproduction system is in the fast forward or rewind drive mode;

b. recorded passage detection circuit means connected to receive signals from the sensing head for generating a silence detection signal when the sensing head reaches a silence portion between recorded programs;

c. down counter means which counts down one count in response to each occurence of a silence detection signal;

d. key input means for introducing a desired number into the down counter;

e. count output detection circuit means for generating a control signal when the down counter counts from said desired number down to zero; and

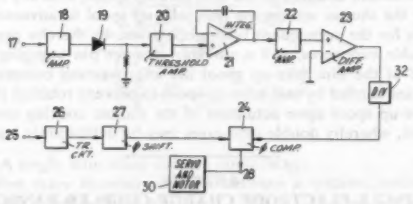
f. shifting means for shifting the operational states of the tape reproduction system upon receiving the control signal.

4,014,040

APPARATUS FOR AUTOMATIC TRACK REGISTRATION

Wolfgang Kornhaas, Fuerth, Germany, assignor to E.M.V. Elektro-Mechanische Versuchsanstalt, Furth, Germany

Filed Feb. 6, 1974, Ser. No. 440,279
Claims priority, application Germany, Feb. 8, 1973, 2306197
Int. Cl.² G11B 15/46
U.S. Cl. 360—73 **3 Claims**



1. An automatic track searching device for a magnetic video tape recorder/reproducer comprising magnetic tape supply and take-up reels, tape transport means operatively associated with said reels, a guide drum provided with a slot and helically encircled at a determinable wrap angle by the magnetic tape, at least one video head rotating in said guide drum and scanning said tape through said slot in diagonal video tracks, and a stationary track finding magnetic head in said guide drum within said wrap angle and having a magnetic gap flush with the guide drum surface and having a length equal to the width and a direction perpendicular to the direction of said video tracks; said track finding head scanning about the center of the magnetic tape in longitudinal direction to produce an

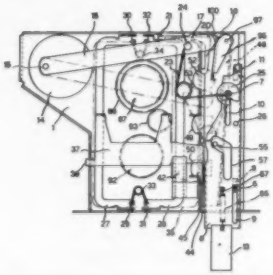
amplitude-modulated high-frequency output voltage, the peaks of said output voltage being a measure of the actual position of said video tracks; a threshold amplifier, said output voltage, after being amplified and rectified, being applied to said threshold amplifier, said threshold amplifier having a threshold voltage which is lower than the peak of said output voltage and higher than said peak voltage multiplied by the difference of said video track width and the interspace between said video tracks and divided by said video track width; a phase comparator, the output of said threshold amplifier being connected to said phase comparator and being phase compared with the rated position signals of said rotating video head to form an error signal; said error signal being applied to said tape transport means to readjust the relative positions of said tape and said rotating video head so as to minimize tracking error between said video head and said video tracks.

4,014,041

CASSETTE RECORDING AND HANDLING DEVICE

Rodolfo Cicatelli, Rome, Italy, assignor to Autovox S.p.A., Roma, Italy

Filed Apr. 1, 1975, Ser. No. 564,204
Claims priority, application Italy, Apr. 5, 1974, 50170/74
Int. Cl.² G11B *15/10, 15/24*
U.S. Cl. 360—96 **5 Claims**



1. In a cassette recorder having a frame, a tape transport mechanism operable in fast forward and fast rewind modes in response to a control device therefor, and a cassette handling mechanism mounted in said frame, and a motor driving said tape transport mechanism: a slide member reciprocable on a bridge of said frame between an internal, retracted position and an external, extracted position, said slide having a slot therein and having a front end and a rear end; a spring biasing said slide toward its external position; an arm pivoted in said frame and carrying a recording head, an erase head and a pressure roller of a capstan, said arm also carrying a pivot engaging said slot in said slide to shift said heads and said pressure roller into inoperative positions when the slide is pushed inward into its retracted position and to shift said heads and pressure roller into operative positions when said slide is moved to its extracted position; a handle linked to the front end of said slide and engaging said arm and the control device for selecting the fast forward and rewind modes of said tape transport mechanism.

4,014,042

TAPE RECORDER AND MAGNETIC TAPE CASSETTE

Klaus Schoettle, Ludwigshafen; Heinrich Wittkamp, Mannheim; Karl Uhl, Frankenthal, and Gerhard Rotter, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

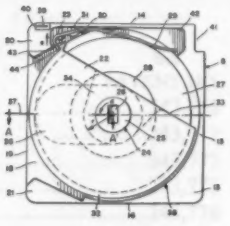
Continuation-in-part of Ser. No. 467,636, May 7, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,301
Claims priority, application Germany, May 9, 1973, 2323327
Int. Cl.² G11B *23/02, 15/32*
U.S. Cl. 360—132 **10 Claims**

1. A magnetic tape cassette comprising a housing containing a tape roll wound on a reel, said housing having an opening formed in a wall thereof, and said housing containing

a sheath partly surrounding the roll,

means mounting said reel in said housing for both rotational and transverse movement relatively thereto, and

means mounting said sheath in said housing for movement relatively thereto from a normal position in which said



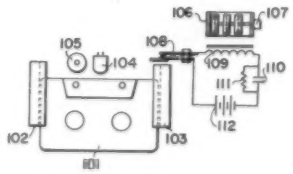
sheath substantially keeps said reel from transversely moving relatively to said housing and in which said sheath closes said opening, to an operative position in which said reel is freed for transverse movement in the direction of said opening and part of the roll of tape thereon is made accessible for edge driving from the outside of said opening.

4,014,043

CASSETTE TYPE MAGNETIC RECORDING AND REPRODUCING APPARATUS

Tetsuji Yoshii, Neyagawa, Japan, assignor to Matsushita Electrical Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 71,592, Sept. 11, 1970, Pat. No. 3,872,509. This application May 15, 1974, Ser. No. 470,305
Claims priority, application Japan, Sept. 19, 1969, 44-76031; Oct. 2, 1969, 44-78825; Mar. 31, 1970, 45-27573; Apr. 17, 1970, 45-37730[U]; Apr. 17, 1970, 45-37731[U]
Disclosure was also published under the second Trail Voluntary Protest Program on Apr. 6, 1976
Int. Cl. G11B *27/14*
U.S. Cl. 360—137 **1 Claim**



1. A cassette type magnetic recording and reproducing machine in which a tape is housed in a cassette, comprising:

a. a cassette support;

b. means for indicating the amount of feed of the tape in the cassette; and

c. means, interposed between the cassette support and the indicating means, for automatically zero resetting the indicating means directly in response to movement of the cassette into the playing position of the tape, including, in electrical circuit, a power source, a switch which is closed on movement of the cassette into the playing position of the tape, an electromagnet which resets said indicating means, and a resistor and capacitor having a predetermined relatively short time constant, said electromagnet being operative for a relatively short time until said capacitor is charged.

DESIGN PATENTS

GRANTED MARCH 22, 1977

ERRATA

For CLASS	See PATENT NO.
016–028	243,758
014–044	243,771
013–033	243,772
014–058	243,773
024–023	243,776
048–024 A	243,787
014–071	243,794
015–007	243,796
028–019	243,800

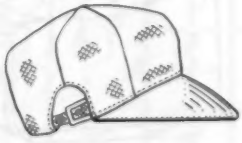
243,721
BRIEFS
John Neville Lloyd, 80a Walsingham Road, Hove, Sussex BN3 4FF, England
Filed Apr. 21, 1975, Ser. No. 570,240
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—10

243,722
BRASSIERE
Louise Poirier, Montreal, Canada, assignor to Canadian Lady-Canadelle Inc., Montreal, Canada
Filed Jan. 14, 1975, Ser. No. 540,944
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—24

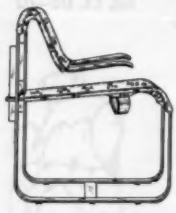
243,723
VEST
Francis A. Schaefer, Wilson, Wyo., assignor to Rocky Mountain Featherbed Company, Inc., Jackson, Wyo.
Filed Feb. 24, 1975, Ser. No. 552,161
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—190

243,724
JACKET
Francis A. Schaefer, Wilson, Wyo., assignor to Rocky Mountain Featherbed Company, Inc., Jackson, Wyo.
Filed Feb. 24, 1975, Ser. No. 552,160
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—191

243,725
VISOR CAP
Erline L. Huffman, P.O. Box 621, Litchfield Park, Ariz. 85340
Filed May 21, 1975, Ser. No. 579,671
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—244

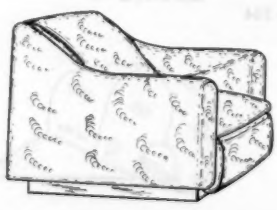


243,726
CHAIR
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed Mar. 18, 1975, Ser. No. 559,448
Claims priority, application Italy, Sept. 19, 1974, 60914/74
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

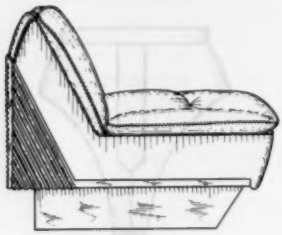


243,727
ARMCHAIR
Ricardo Godofredo Blanco, Buenos Aires, Argentina, assignor to Dia S.R.L., Buenos Aires, Argentina
Filed June 20, 1975, Ser. No. 588,828
Claims priority, application Argentina, May 30, 1975, 27923
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

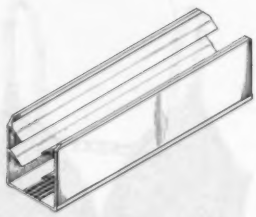
243,728
UPHOLSTERED SEAT
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed July 14, 1975, Ser. No. 595,405
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



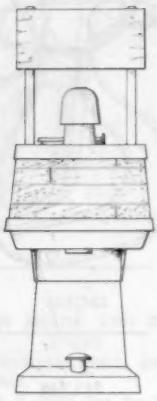
243,729
CHAIR
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti, Besnate (Varese), Italy
Filed Mar. 18, 1975, Ser. No. 559,390
Claims priority, application Italy, Sept. 19, 1974, 60918/74
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—75



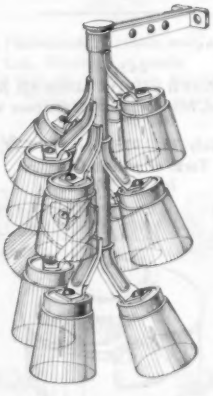
243,730
WAND HOLDER
Robert B. Koenig, Dallas, and Rodney Barclay, Richardson, both of Tex., assignors to Recognition Equipment Incorporated, Dallas, Tex.
Filed Dec. 15, 1975, Ser. No. 640,919
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—85



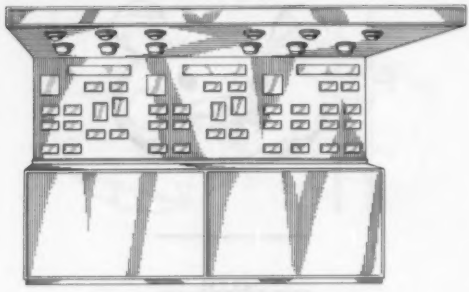
243,731
SOAP DISPENSER OR THE LIKE
Linda Jansen Donaldson, Cincinnati, Ohio, assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed Apr. 14, 1975, Ser. No. 567,912
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95



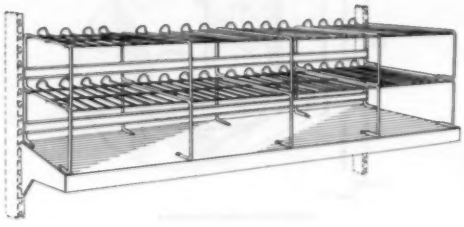
243,732
COMBINED DISPLAY AND STORAGE RACK
Joseph J. Vogt, 4294-26th St., Dorr, Mich. 49323
Filed Mar. 3, 1975, Ser. No. 554,479
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—127



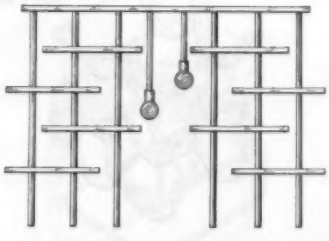
243,733
JEWELRY DISPLAY CASE
Jerry Shaw, 50 W. Fairlawn Blvd., and Samuel G. Solitt, 2121 Brookshire Road, both of Akron, Ohio 44313
Filed Nov. 12, 1975, Ser. No. 630,979
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—127



243,734
DISPLAY RACK
Rafael T. Bustos, Atlanta, Ga., assignor to Leggett & Platt Incorporated and International Beverage Supply Displays Inc., part interest to each
Filed June 25, 1975, Ser. No. 590,397
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—134

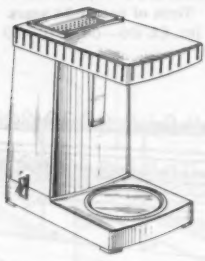


243,735
SHELVING AND LIGHT FIXTURES THEREFOR
Richard Walton Enners, 172 Wedgewood Circle, Eatontown, N.J. 07724
Filed Oct. 21, 1975, Ser. No. 624,462
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186

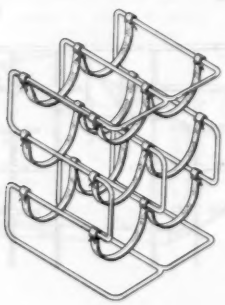


243,736
PILLOW
Haruo Ishizuka, 2043-19, Bingo, Kasukabe, Saitama, Japan
Filed Oct. 31, 1974, Ser. No. 519,764
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—203

243,737
COFFEEMAKER
David L. Painter, Glenview, Ill., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Aug. 15, 1975, Ser. No. 605,131
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—62



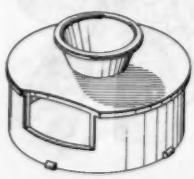
243,738
WINE RACK
Michael K. Johnson, 1230 Monterey Blvd., San Francisco, Calif. 94127
Filed Oct. 3, 1975, Ser. No. 619,210
Term of patent 14 years
Int. Cl. D7—*99*; D6—*04*
U.S. Cl. D7—71



243,739
MEAT LIFTING TONGS
James P. Mazza, 1135 Fifth St., Sandusky, Ohio 44870
Filed Sept. 4, 1975, Ser. No. 610,148
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—105

243,740
HIBACHI
William R. Small, P.O. Box 1874, Ontario, Calif. 91762
Filed Aug. 11, 1975, Ser. No. 603,763
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—110

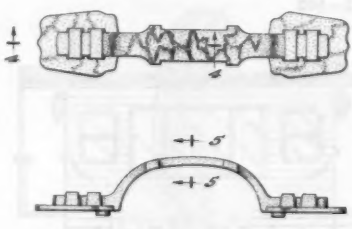
243,741
COFFEEMAKER LID OR SIMILAR ARTICLE
Max C. Hauenstein, Monroe, Conn., assignor to General Electric Company
Filed July 28, 1975, Ser. No. 599,415
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—131



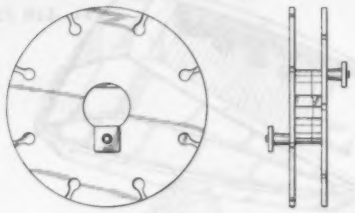
243,742
CORDLESS TOOL
Lawrence Emmerson House, II, Baltimore, and Roderick Francis Bunyea, Cockeysville, both of Md., assignors to The Black and Decker Manufacturing Company
Filed Aug. 19, 1975, Ser. No. 605,860
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—69

243,743
MANUAL WINDOW SHADE AND ROLLER CUT OFF KNIFE
Paul J. Erpenbeck, Muskegon, Mich., assignor to Breneman, Inc., Cincinnati, Ohio
Filed Feb. 4, 1976, Ser. No. 655,123
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98

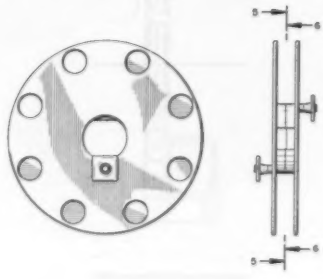
243,744
PULL
Hubert Dolnar, Pierrefonds, Canada, assignor to Unican Security Systems, Ltd., Montreal, Canada
Filed Feb. 25, 1976, Ser. No. 661,172
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—318



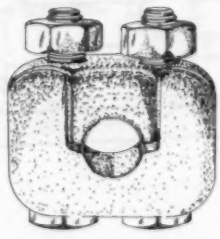
243,745
SKI ROPE REEL
John W. Youngblood, 3201 Franklin, Waco, Tex. 76710
Filed Apr. 26, 1976, Ser. No. 679,888
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—359



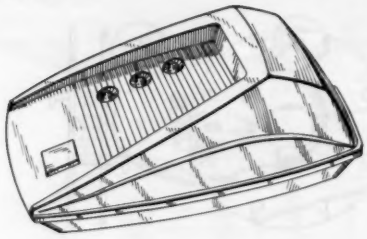
243,746
PORTABLE REEL
John W. Youngblood, 3201 Franklin, Waco, Tex. 76710
Filed May 10, 1976, Ser. No. 684,855
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—359



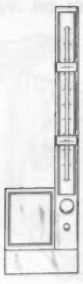
243,747
WIRE CLAMP
Carl Unghanse, Sollentuna, Sweden, assignor to AB Lundquists Patenter, Stockholm, Sweden
Filed Aug. 1, 1975, Ser. No. 601,140
Claims priority, application Sweden, Feb. 4, 1975, 259/75
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—396



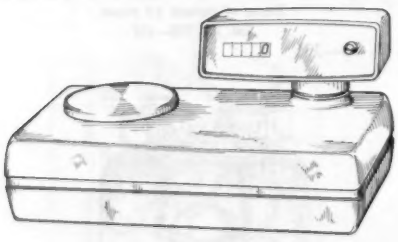
243,748
INTERVAL SIGNALLING TIMER
Daniel F. Krause, Loveland, Colo., assignor to Teletymer Inc., Denver, Colo.
Filed July 3, 1975, Ser. No. 592,738
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—40



243,749
ELECTRONIC PART SIZING GAGE
Edward F. Menninger, Sterling Heights, Mich., assignor to The Valeron Corporation, Oak Park, Mich.
Filed Sept. 11, 1975, Ser. No. 612,485
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—71

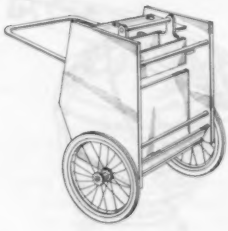


243,750
DIGITAL DISPLAY BALANCE
Bernard Wasko, Bronxville, and Manfred Hegemann, Nyack, both of N.Y., assignors to Voland Corporation, New Rochelle, N.Y.
Filed Jan. 23, 1975, Ser. No. 543,623
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91

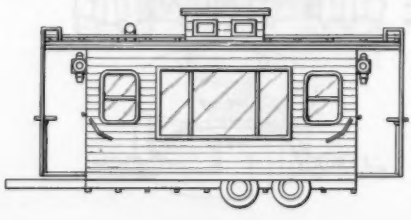


243,751
KEYBOARD FOR A CALCULATOR OR A COMBINED CALCULATOR AND WATCH OR SIMILAR ARTICLE
John Price, 20 Trask Road, Peabody, Mass. 01960; Richard E. Seeger, 1 Hill St., Topsfield, Mass. 01983, and William J. Lynn, 2 Murray Road, Groveland, Mass. 01834
Filed Mar. 6, 1975, Ser. No. 555,854
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—122

243,752
CART FOR HOUSE AND GARDEN TOOLS
James R. Kardas, Manchester Center, Vt. 05255
Filed Oct. 20, 1975, Ser. No. 624,082
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—32

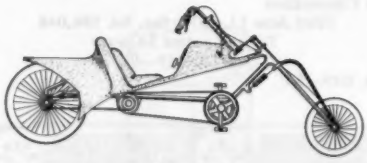


243,753
TRAILER
Kenneth A. Raupp, and Ruth M. Raupp, both of 22260 Edison, Dearborn, Mich. 48124
Filed Sept. 2, 1975, Ser. No. 609,798
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—102

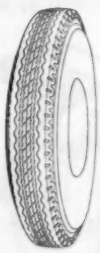


243,754
BICYCLE
John Cruze Silva, Jr., P.O. Box 1082, Saugus, Mass. 01970
Filed May 5, 1975, Ser. No. 574,407
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111

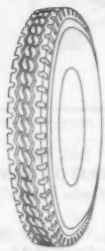
243,755
BICYCLE
John Cruze Silva, Jr., P.O. Box 1082, Saugus, Mass. 01970
Filed May 5, 1975, Ser. No. 574,408
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



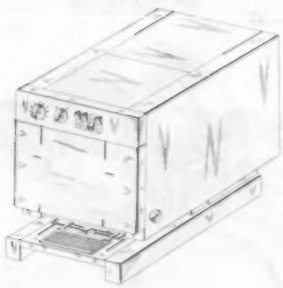
243,756
VEHICLE TIRE
Shigeo Makino, Tokorozawa; Hiroshi Kojima, Hino; Toshio Hayakawa, Kodaira, and Shigeo Watanabe, Kokubunji, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed May 14, 1976, Ser. No. 686,281
Claims priority, application Japan, Dec. 26, 1975, 50-50904
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142



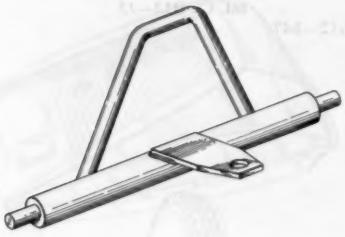
243,757
VEHICLE TIRE
Toshio Hayakawa, Kodaira, and Sigemitsu Nakamura, Murayama, both of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan
Filed May 14, 1976, Ser. No. 686,280
Claims priority, application Japan, Dec. 8, 1975, 50-47914
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—147



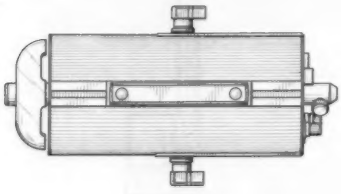
243,758
MICROFICHE READER-PRINTER
Paul D. Miller, New York, N.Y., assignor to GAF Corporation, New York, N.Y.
Filed Apr. 7, 1975, Ser. No. 565,377
Term of patent 14 years
Int. Cl. D16—*3*
U.S. Cl. D16—28



243,759
TRACTOR TOWING HITCH
Jerry L. Utzinger, 6268 Jackson Pike, Grove City, Ohio 43123
Filed Dec. 11, 1975, Ser. No. 639,779
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D15—28



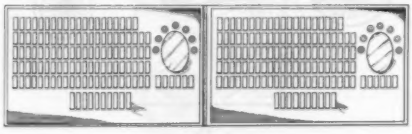
243,760
PHOTO LAMP
Robert C. Devinney, Jr., Costa Mesa, Calif., assignor to Larson Enterprises, Inc.
Filed Aug. 7, 1975, Ser. No. 602,913
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42



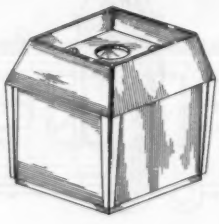
243,761
BINOCULAR WITH EYECUPS THEREFOR
Claus O. Huckenbeck, Sherman Oaks, Calif., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.
Filed Feb. 14, 1975, Ser. No. 549,878
The portion of the term of this patent subsequent to June 18, 1988, has been disclaimed.
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. 16—59

243,762
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Oct. 28, 1975, Ser. No. 626,163
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

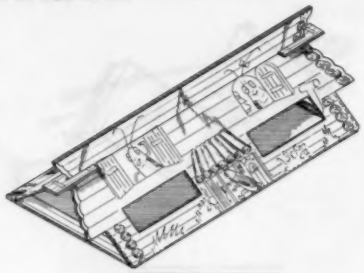
243,763
COLOR SELECTION GUIDE
Robert C. Dorr, Woodland Hills, Calif., assignor to Ameritone Paint Corporation
Filed June 11, 1975, Ser. No. 586,046
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—59



243,764
COMBINED PENCIL SHARPENER AND CATCH BOX
Werner Möbius, Hindenburgstrasse 77, Erlangen, Germany (8520)
Filed Aug. 4, 1975, Ser. No. 601,405
Claims priority, application Germany, Feb. 3, 1975, 7064
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—73



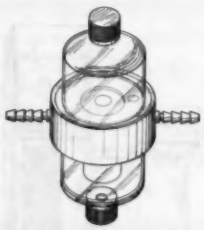
243,765
COLLAPSIBLE COCKROACH CATCHER OR SIMILAR ARTICLE
Tadanobu Nakai, Nara, Japan, assignor to Tokiwa Chemical Industries, Limited, Osaka, Japan
Filed Dec. 29, 1975, Ser. No. 645,031
Term of patent 14 years
Int. Cl. D22—*06*
U.S. Cl. D22—19



243,766
SUMP BASIN
Harold Isaacs, 3107 Wilmette Ave., Wilmette, Ill. 60091
Filed Sept. 29, 1975, Ser. No. 617,305
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—1

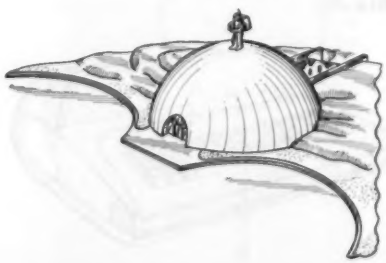
243,767
WATER SOFTENER
Harry Wayne Rutherford, 1661 Molina Lane, Gardena, Calif. 90247
Filed Nov. 24, 1975, Ser. No. 634,999
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3

243,768
BRAKE FLUID FILTER
Charles R. Hinojosa, Camuy, P.R., assignor to Besenbruch-Hofmann Inc., Lindenhurst, N.Y.
Filed Sept. 2, 1975, Ser. No. 609,377
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

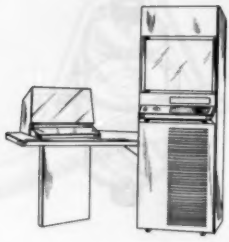


243,769
DRIP CATCHER FOR A PAINT SPRAY GUN
Chris A. Rocchio, 724 NW. 28th St., Wilton Manors, Fla. 33311
Filed July 23, 1975, Ser. No. 598,180
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—36

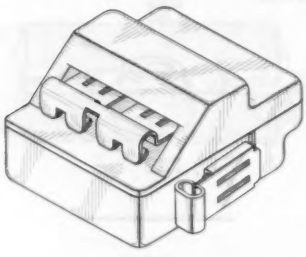
243,770
RESTAURANT BUILDING
Constantine P. Gianacakos, 8695 Meade St., Montague, Mich. 49437
Filed Oct. 18, 1974, Ser. No. 516,014
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—9



243,771
COMPUTER OR SIMILAR ARTICLE
John F. Graham, Sudbury, and Richard R. Dillon, Marlboro, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.
Filed Nov. 28, 1975, Ser. No. 635,839
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—44

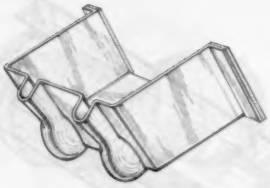


243,772
MOTOR CONTROLLING RELAY
Eugene T. McKinnon, Pacific Palisades; Alvin S. Drutz, Los Angeles, and Randall Danta, Reseda, all of Calif., assignors to Eugene T. McKinnon and Alvin S. Drutz
Filed Feb. 13, 1975, Ser. No. 549,754
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—33



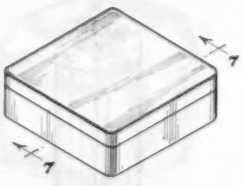
243,773
SWITCHBOARD FOR TELECOMMUNICATIONS SWITCHING SYSTEM
Donald A. Foggia, West Deal, N.J., assignor to Siemens Corporation, Iselin, N.J.
Filed Mar. 11, 1976, Ser. No. 666,063
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—58

243,774
COMBINED PIPE AND TOBACCO CONTAINER
Perry J. Molinaro, 641 Bower Hill Road, Pittsburgh, Pa. 15243
Filed Jan. 15, 1975, Ser. No. 541,192
Term of patent 3½ years
Int. Cl. D27—*99*
U.S. Cl. D27—6

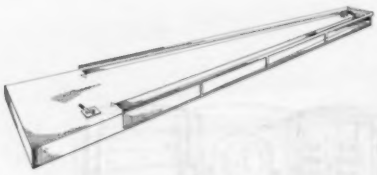


243,775
LIGHTER
Yoichi Ohsawa, Tokyo, Japan, assignor to Win Lighter Corporation, Tokyo, Japan
Filed Aug. 26, 1975, Ser. No. 607,886
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

243,776
MORTAR AND PESTLE COVER
Arthur J. Gregory, 17931 S. Dixie Hwy., Miami, Fla. 33157
Filed Apr. 11, 1975, Ser. No. 567,313
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—23

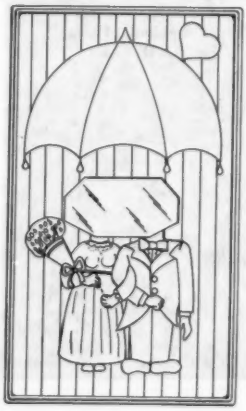


243,777
PUTTING TARGET UNIT FOR A GOLF GAME APPARATUS
Frederick T. Lewis, 1141 Lighthouse Ave., Pacific Grove, Calif. 93950
Filed Feb. 21, 1975, Ser. No. 551,518
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 NN

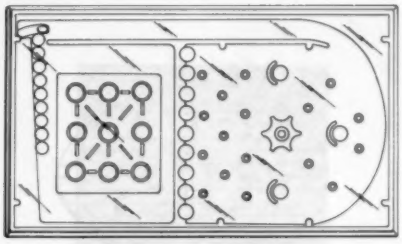


243,778
GOLF CLUB HEAD
William R. Raymont, 25001 El Cartijo, Mission Viejo, Calif. 92675
Filed June 16, 1975, Ser. No. 587,083
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

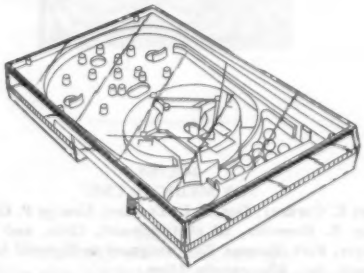
243,779
POCKET AMUSEMENT DEVICE
Arisuke Yamagata, No. 9-10, Tateishi, 7-chome, Katsushika, Tokyo, Japan
Filed Aug. 13, 1975, Ser. No. 604,097
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R



243,780
POCKET PIN BALL GAME BOX
Arisuke Yamagata, No. 9-10, Tateishi, 7-chome, Katsushika, Tokyo, Japan
Filed Aug. 13, 1975, Ser. No. 604,313
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ

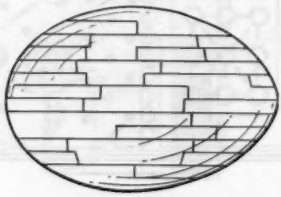


243,781
POCKET BASEBALL GAME BOX
Arisuke Yamagata, No. 9-10 Tateishi, 7-chome, Katsushika, Tokyo, Japan
Filed Aug. 13, 1975, Ser. No. 604,314
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 BG

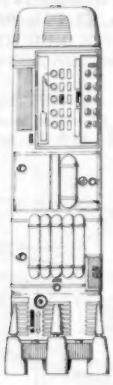


243,782
HOOP TARGET FOR LAWN GAME
Thomas F. G. Hickey, 37 Washington Road, Pittsford, N.Y. 14534
Filed Sept. 19, 1975, Ser. No. 615,190
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 PP

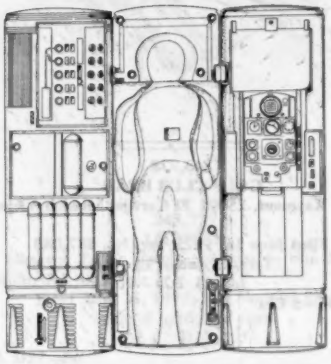
243,783
PUZZLE OR SIMILAR ARTICLE
Leonard Kleinman, 163 Bergen St., Brooklyn, N.Y. 11217, and Harry Zelenko, 240 E. 61st St., New York, N.Y. 10021
Filed Jan. 24, 1975, Ser. No. 543,866
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 M



243,784
TOY MEDICAL UNIT
Robert E. Cordrey; Donald E. England; George P. Giordano; Alan E. Hoeweler, all of Cincinnati, Ohio, and John F. Mayer, Fort Thomas, Ky., assignors to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed May 22, 1975, Ser. No. 579,753
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R

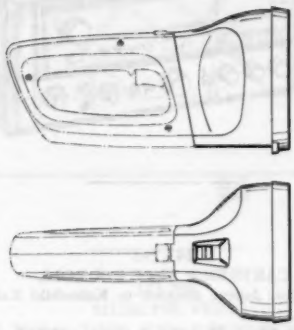


243,785
TOY MEDICAL UNIT
Robert E. Cordrey; Donald E. England; George P. Giordano; Alan E. Hoeweler, all of Cincinnati, Ohio, and John F. Mayer, Fort Thomas, Ky., assignors to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed May 22, 1975, Ser. No. 580,089
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R

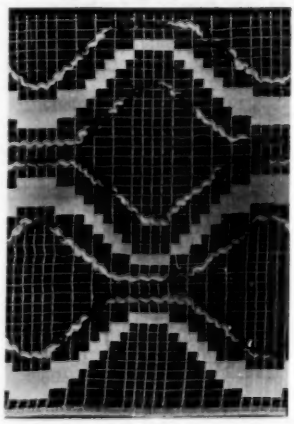


243,786
TOY BABY CARRIAGE
John V. White, 13206 Bryson St., Arleta, Calif. 91331
Filed July 11, 1975, Ser. No. 595,033
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

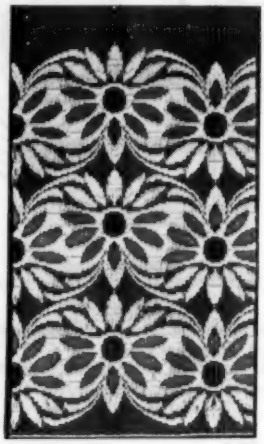
243,787
DETACHABLE FLASHLIGHT HEAD
Roderick Francis Bunyea, Cockeysville, Md., assignor to The Black and Decker Manufacturing Company
Filed Aug. 19, 1975, Ser. No. 605,839
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A



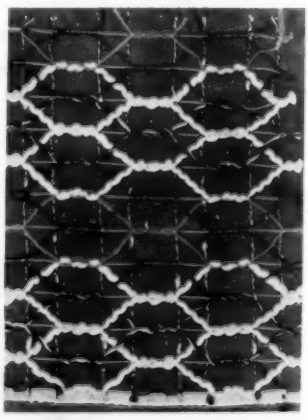
243,788
CURTAIN MATERIAL
Peter E. Schroeder, AM Falter 8, CH866 Lucerne, Switzerland
Filed Aug. 25, 1975, Ser. No. 607,835
Claims priority, application Germany, May 26, 1975, 360
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E



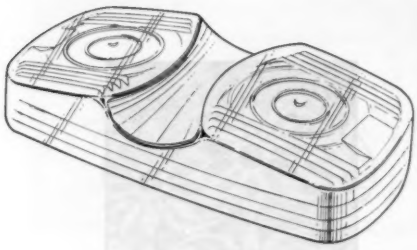
243,789
CURTAIN MATERIAL
Peter E. Schroeder, AM Falter 8, CH866 Lucerne, Switzerland
Filed Aug. 25, 1975, Ser. No. 607,839
Claims priority, application Germany, May 26, 1975, 360
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E



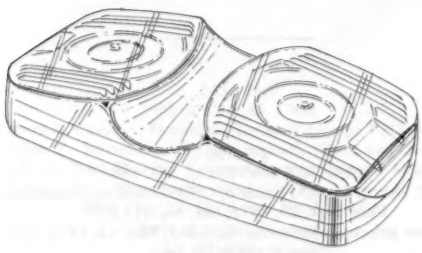
243,790
CURTAIN MATERIAL NO. 588
Peter E. Schroeder, AM Falter 8, CH866 Lucerne, Switzerland
Filed Sept. 29, 1975, Ser. No. 617,677
Claims priority, application Germany, May 13, 1975, 289
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E



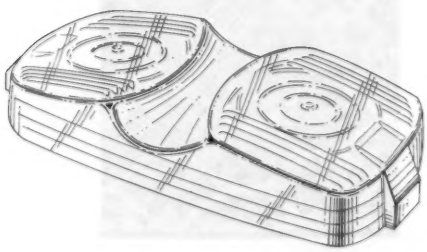
243,791
MARKER LENS
Robert I. Nagel, Skokie, Ill., assignor to Dominion Auto Accessories Limited, Toronto, Canada
Filed Nov. 29, 1974, Ser. No. 528,164
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 A



243,792
MARKER LENS
Robert I. Nagel, Skokie, Ill., assignor to Dominion Auto Accessories Limited, Toronto, Canada
Continuation-in-part of Ser. No. 528,164, Nov. 29, 1974. This application Dec. 29, 1975, Ser. No. 645,034
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 A

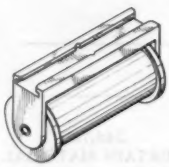


243,793
MARKER LENS
Robert I. Nagel, Skokie, Ill., assignor to Dominion Auto Accessories Limited, Toronto, Canada
Continuation-in-part of Ser. No. 528,164, Nov. 29, 1974. This application Mar. 11, 1976, Ser. No. 666,081
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 A

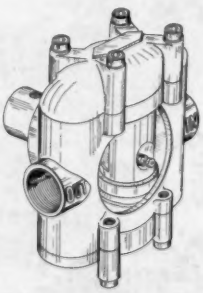


243,794
COMBINED AMPLIFIER AND TUNER
Hitoshi Mukai, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan
Filed June 18, 1975, Ser. No. 588,109
Claims priority, application Japan, Feb. 19, 1975, 50-6506
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—71

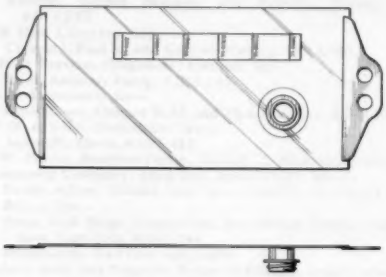
243,795
CARTRIDGE TYPE INK ROLL
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Japan
Filed Dec. 23, 1974, Ser. No. 535,212
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D64—11 R



243,796
PUMP
Ramon Pareja, Minneapolis, Minn., assignor to Lear Siegler, Inc., Santa Monica, Calif.
Filed July 10, 1975, Ser. No. 594,727
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—7

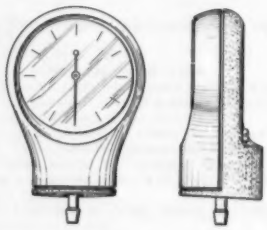


243,797
FLEXIBLE CONTAINER FOR BARIUM RADIOLOGICAL EXAMINATIONS
Franklin R. Greene, Flushing, N.Y., assignor to E-Z-EM Company Inc., Westbury, N.Y.
Filed June 30, 1975, Ser. No. 591,628
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1 U



243,798
MEDICINE TRAY
Ronald E. Swartz, Toledo, Ohio, assignor to The Lane Drug Company, Toledo, Ohio
Filed Oct. 4, 1974, Ser. No. 511,948
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1.0

243,799
SPHYGMOMANOMETER
Mace Hudson Bell, Rowayton, Conn., assignor to Sybron Corporation, Rochester, N.Y.
Filed May 17, 1976, Ser. No. 686,931
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R



243,800
HEATED CAP FOR CONDITIONING HAIR AND PERMANENT WAVING
Richard Mast, Brooklyn, N.Y., assignor to Ricar Industries Inc., Brooklyn, N.Y.
Filed May 23, 1975, Ser. No. 580,490
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—19

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF MARCH, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Chance Company: *See—*
Roberts, Gerald Bernard; and Roberts, Richard Eugene, 4,013,852.

A. B. Dick Company: *See—*
Colecchi, Paul S.; and Kotecki, Cezary, 4,013,160.

A. H. B. Services (Engineers) Limited: *See—*
Bush, Anthony Harry, 4,013,165.

A/S E. Rasmussen: *See—*
Christensen, Gunnar Buhl; and Thastrup, Ove, 4,013,924.

A.V.D. A Votre Disposition: *See—*
Jaconelli, Pierre, 4,013,482.

A. W. Ferrin, Beatrice Ferrin, Donald H. Stephen, Trustees of the Lectrojog Company, Trust U/A dated 1/1/74: *See—*
Ferrin, Albert William; and Callos, John G., 4,013,171.

AB Bofors: *See—*
Blom, Rolf Helge; Forshufvud, Sten Harald Ragnar; and Skagerlund, Lars-Erik, 4,013,244.
Brandstrom, Karl Ivar, 4,012,938.

Abblard, Jean; and Poignant, Pierre, to PEPRO, Societe pour le Developement et la Vente de Specialities Chimiques. Preparation of n-aryl-imidocarbonyl ureas. 4,013,716, Cl. 260-553.00A.

Abbondante, Cosmo, to Bofors America, Inc. Vehicle detection apparatus. 4,013,851, Cl. 200-86.00R.

Abbott Laboratories: *See—*
Betka, Harold Anthony, 4,013,187.
Farhadieh, Bahram; and Berdahl, James Maynard, 4,013,820.

Abdenour, Joseph D., to American Denture Corporation. Method for producing artificial dentures. 4,012,838, Cl. 32-2.000.

Abdulla, Riaz F., to Eli Lilly and Company. Synthesis of 3,5-diphenyl-4(1H)-pyridazinones. 4,013,658, Cl. 260-250.00A.

Abe, Keiji: *See—*
Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, 4,013,585.

Abe, Miwako: *See—*
Nakasone, Yumio; Abe, Miwako; and Mizutani, Hiroshi, 4,013,579.

Abolins, Visvaldis; and Holub, Fred F., to General Electric Company. Reinforced intercrystalline thermoplastic polyester compositions. 4,013,613, Cl. 260-40.00R.

Abrams, Gilbert Lawrence. Method for molding composite articles. 4,012,827, Cl. 29-453.000.

Acacia Engenharia Industria E Commercio: *See—*
Netto, Tito Livio Martins; and Barbetta, Ludgero Raul, 4,012,871.

Acker, Jesse L.; and Meserol, Peter M., to Akro-Medic Engineering, Inc. Sample cartridge for use in apparatus for evaluation of biological fluid. 4,013,368, Cl. 356-246.000.

Ackermann, Otto; Bleh, Otto, deceased (by Bleh, Rita); and Morgenstern, Dieter, to Dynamit Nobel Aktiengesellschaft. Process for the preparation of pyridylamino-methylenemalonic acid derivatives. 4,013,656, Cl. 260-294.900.

Active Fire Sprinkler Corporation: *See—*
Hirsch, Morti, 4,012,875.

Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, to Chisso Corporation; and Chisso Engineering Co. Ltd. Process for regenerating absorbing solution used for exhaust gas purification. 4,013,430, Cl. 55-37.000.

Adamo, Joe J. Vehicle burglar alarm. 4,013,995, Cl. 340-65.000.

Adams, Theodore J.: *See—*
Porter, Stephen G.; and Adams, Theodore J., 4,013,033.

Addressograph Multigraph Corporation: *See—*
Foote, Francis C.; and Beck, Charles K., 4,013,894.

Adelberg, Marvin. Clamp for regulating fluid flow through plastic tubing. 4,013,263, Cl. 251-6.000.

Adelstein, Gilbert W.; Karim, Aziz; and Yen, Chung H., to G. D. Searle & Co. 5-(1,1-Diphenyl-3-(5- or 6-hydroxy-2-azabicyclo(2.2.2)oct-2-yl)propyl)-2-alkyl-1,3,4-oxadiazoles and related compounds. 4,013,668, Cl. 260-293.540.

Adolphi, Heinrich; Wunsch, Gerd; and Kiener, Volker, to BASF Aktiengesellschaft. Substituted fluorophosphazenes. 4,013,740, Cl. 260-927.00N.

Adsorbex, Incorporated: *See—*
Taylor, R. Daniel, 4,013,566.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Cohen-Solal, Gerard; Zozime, Alain; and Sella, Claude, 4,013,533.
Jolles, Pierre; and Migliore-Samour, Daniele, 4,013,788.

Agency of Industrial Science & Technology: *See—*
Kosugi, Yoshitsugu; Suzuki, Hideo; and Kamibayashi, Akira, 4,013,512.

AGFA-Gevaert, A.G.: *See—*
Bergthaller, Peter; Himmelmann, Wolfgang; and Schranz, Karl-Wilhelm, 4,013,468.
Bestenreiner, Friedrich; Giglberger, Dieter; and Weidkuhn, Gert, 4,013,356.

AGFA-GEVAERT N.V.: *See—*
Hellemans, Albert Joseph, 4,013,204.
Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, 4,013,471.
Willems, Jozef Frans; Poot, Albert Lucien; Van Besauw, Jan Frans; Klein, Alfons; and Wedemeyer, Karlfried, 4,013,473.

Aggarwal, Pawan Kumar, to Cincinnati Milacron Inc. Apparatus for controlling a magnetic clamp. 4,013,932, Cl. 318-39.000.

Aiage, Kunio: *See—*
Yamaki, Yasuhito; and Aiage, Kunio, 4,013,056.

Aida Engineering Ltd.: *See—*
Imanishi, Shozo, 4,012,937.

Air Preheater Company, Inc., The: *See—*
Kochey, Edward L., Jr.; and Hatch, Edward A., 4,013,024.
Pollock, William Hunter, 4,013,045.

Air Products and Chemicals, Inc.: *See—*
Sircar, Shivaji; and Zondlo, John W., 4,013,429.

Airco, Inc.: *See—*
Cormia, Robert L.; Tsujimoto, Kazumi N.; and Andresen, Sigurd, 4,013,532.

Airprint Systems, Inc.: *See—*
Warning, Walter B., Sr.; and Warning, Walter B., Jr., 4,013,037.

Aizawa, Tatsuo: *See—*
Nakajima, Tadanobu; and Aizawa, Tatsuo, 4,013,357.

Ajdukovic, Djordje: *See—*
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Schrenk, Heinrich Maria, 4,013,770.

Ajinomoto Co., Inc.: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, 4,013,800.

Akachi, Hisateru; Miyajima, Hideo; and Yaguchi, Mitsuro, to Oki Densen Kabushiki Kaisha. Conductor twisting system for twisting a running wire conductor. 4,012,894, Cl. 57-34.0AT.

Akita, Yukio: *See—*
Green, Mitchell V.; Akita, Yukio; and Tachikawa, Mitsuji, 4,013,285.

Akiyama, Katsuhiko, to Sony Corporation. Method of making display structure having light emitting diodes. 4,012,833, Cl. 29-591.000.

Akiyama, Yoshinori: *See—*
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,013,306.

Akiyoshi, oshio; and Shibuya, Hakushi, to Mitsubishi Denki Kabushiki Kaisha. Clamping tool and method. 4,013,895, Cl. 307-126.000.

Akro-Medic Engineering, Inc.: *See—*
Acker, Jesse L.; and Meserol, Peter M., 4,013,368.

Aktiebolaget Svenska Flaktfabriken: *See—*
de Feudis, Sergio, 4,013,551.

Akzona Incorporated: *See—*
Panneman, Harm Jan, 4,013,682.

Alberto Culver Company: *See—*
Cella, John A.; Fiebig, August Emil, Jr.; and Pum, Franz J., 4,013,786.

Albright, Alva Z. Flywheel tree feller and buncher. 4,013,106, Cl. 144-34.00R.

Alford, John A., to Westvaco Corporation. Water-dilutable polyamide resins and water-dilutable epoxy resin compositions containing said polyamide resins. 4,013,601, Cl. 260-18.0PN.

Alliance Manufacturing Company, Inc., The: *See—*
Deming, Andrew F., 4,013,910.

Allis-Chalmers Corporation: *See—*
Fear, James R., 4,013,136.

Allis, Robert F., to Xerox Corporation. Optical apparatus and reproducing machine. 4,013,361, Cl. 355-60.000.

Alt, Gerhard H.; and Kloek, James A., to Monsanto Company. 1,2,4-Triazol-5-yl sulfamides. 4,013,448, Cl. 71-92.000.

Altermatt, Ruedi, to Sandoz Ltd. N,N-diethyl-4-(2,4-dinitro-6-alkylsulfonylphenylazo)-2-alkoxy-5-alkyl-carbonylaminoanilines. 4,013,636, Cl. 260-207.000.

Altus Corporation: *See—*
Giattino, Louis Robert, 4,013,012.

Alverson, Thomas E.; Soles, Otto H.; Hopkins, Melvyn D.; and LeRow, Charles E., Jr., to Westinghouse Electric Corporation. Multi-phase compressed-gas circuit-breaker construction. 4,013,853, Cl. 200-148.00B.

Amberg, Stephen W., to Owens-Illinois, Inc. Method for producing shrunken pilfer-proof neck labels on containers. 4,013,496, Cl. 156-85.000.

American Chain & Cable Company, Inc.: *See—*
Nelson, Walter T., 4,013,161.

American Cyanamid Company: *See—*
Copeland, Melvin; and Konazewski, William Peter, 4,013,065.
Henderson, William Arthur, Jr.; and Zweig, Arnold, 4,013,620.
Parent, Richard Alfred; and Loffelman, Frank Fred, 4,013,404.

American Denture Corporation: *See—*
Abdenour, Joseph D., 4,012,838.

American Home Products Corporation: *See—*
Sellstedt, John H.; and Klaubert, Dieter H., 4,013,647.

American Optical Corporation: *See—*
Richards, William, 4,012,823.

American Store Equipment Corporation: *See—*
Logie, Charles F., 4,012,880.

American Videonetics Corporation: *See—*
Burke, Richard J.; and Becker, Charles J., 4,013,360.

Amos, David J., to Westinghouse Electric Corporation. Intermediate transition annulus for a two shaft gas turbine engine. 4,013,377, Cl. 415-161.000.

AMP Incorporated: *See—*
Kobler, Robert James, 4,013,331.

Anatol, Jesus; and Berecoechea, Jean, to Sucreries du Soissonnais et Compagnie Sucriere. Derivatives of substituted urea, acyl ureas, and sulphonyl ureas, and a process for producing the same. 4,013,706, Cl. 260-471.00C.

Andersen Corporation: *See—*
Gruetzman, Stanley A., 4,013,804.

Anderson, Bruce W., to Bendix Corporation, The. Segmented friction disc for brakes. 4,013,147, Cl. 188-218.0XL.

Anderson, Scott K., to Teleplex, Inc. TDM and FDM telephone communication. 4,013,840, Cl. 179-15.0FD.

Ando, Kunio; and Saito, Takemi, to Fuji Photo Optical Co., Ltd. Optical image stabilizing system. 4,013,339, Cl. 350-16.000.

Andres, Rudolf; and Moller, Hermann, to Daimler-Benz Aktiengesellschaft. Pneumatic control installation for headlights. 4,013,883, Cl. 240-7.1LJ.

Andresen, Sigurd: *See—*
Cormia, Robert L.; Tsujimoto, Kazumi N.; and Andresen, Sigurd, 4,013,532.

Andrews, George M., to Vega Industries, Inc. Factory-built fireplace with flush hearth installation. 4,013,059, Cl. 126-120.000.

Andros, Incorporated: *See—*
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., 4,013,260.

Andruszkiewicz, Julian. Prehung door assembly. 4,012,868, Cl. 49-380.000.

Angelucci, Joseph L.: *See—*
Angelucci, Thomas L.; and Angelucci, Joseph L., 4,013,209.

Angelucci, Thomas L.; and Angelucci, Joseph L. High force flexible lead bonding apparatus. 4,013,209, Cl. 228-44.10A.

Angenieux-CLB S.A.: *See—*
Lauzier, Rene, 4,013,144.

Anstin, Wayne D. Document scanning and printing system and method. 4,013,876, Cl. 235-151.000.

Antos, George J.; Hayes, John C.; and Pollitzer, Ernest L., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,013,735, Cl. 260-673.500.

Aoki, Teruaki: *See—*
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawada, Yoshiyuki, 4,014,037.

Aoyama, Tetsuo: *See—*
Yonemitsu, Eiichi; Igarashi, Takeo; Osaki, Naoto; Aoyama, Tetsuo; and Nakazato, Yukiya, 4,013,725.

Appleman, William S.: *See—*
Richmond, Albert R.; and Appleman, William S., 4,013,134.

Aptt, Harry W.: *See—*
Clune, James P.; Aptt, Harry W.; and Marci, Sebastian J., 4,013,914.

Aqua-Chem, Inc.: *See—*
Craig, Glenn D.; Feuling, David T.; and LeHaye, Paul G., 4,013,399.

Arai, Hiroshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Central coupler for a centralized monitor system for motor vehicles. 4,013,947, Cl. 324-51.000.

Arai, Hiroshi: *See—*
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,012,948.

Arakawa, Hideyuki: *See—*
Nagoshi, Fumiya; Arakawa, Hideyuki; Uchino, Hayashi; Echigoya, Mitsuru; and Matsuo, Masaki, 4,013,608.

Archer, Jean-Francois. Lifting hooks. 4,013,314, Cl. 294-82.00R.

Archer, Robert A.: *See—*
Cone, John A.; Archer, Robert A.; Pacheco, Edward R.; and Peyton, Creath E., 4,014,028.

ARCO Medical Products Company: *See—*
Kolenik, Steve A.; 4,013,081.

ARCO Polymers, Inc.: *See—*
Granda, Jose E.; Quinlan, John J.; and Garland, James J., 4,013,597.

Armstrong, Bernard C. Walking type agricultural implement with harness. 4,013,131, Cl. 172-370.000.

Armstrong Cork Company: *See—*
Ray, Leonard N., Jr., 4,013,407.

Armstrong, Timothy G.; Kroll, Arthur S.; and Shuster, Frank A., to Eastman Kodak Company. Self-compensating photoconductor web. 4,013,041, Cl. 118-656.000.

Arnado, Christian: *See—*
Nuzillat, Gerard; and Arnado, Christian, 4,013,483.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Ogawa, Ryota, 4,013,350.

Asahina, Masako; Kato, Hideki; and Fukawa, Hideaki, to Nisshin Flour Milling Co., Ltd. Process for the manufacture of solanesol. 4,013,731, Cl. 260-643.00A.

Asanuma, Mitsuru: *See—*
Kino, Yoshihiro; Furuya, Nobuaki; and Asanuma, Mitsuru, 4,013,834.

Ascoli, Enzo, to Gillette Company, The. Dry shavers. 4,012,837, Cl. 30-43.900.

Asea Aktiebolag: *See—*
Hammarlund, Bertil; and Liss, Gote, 4,013,952.

Ashkin, Peter B., to Hewlett-Packard Company. Variable resolution display. 4,014,011, Cl. 340-324.00R.

Ashworth, Brian Thomas: *See—*
Nicholson, Eric Samuel; and Ashworth, Brian Thomas, 4,013,720.

Askew, Barry Anthony; and Holland, Ronald, to National Research Development Corporation. High temperature secondary batteries. 4,013,818, Cl. 429-112.000.

Astro Plastics, Inc.: *See—*
Ellingson, Robert T., 4,012,878.

Atlantic Research Institute Limited: *See—*
Reininger, Wolfgang; and Hartl, Alfons, 4,013,721.

Atley, Robert B.: *See—*
Puderbaugh, George; Myers, Thomas S.; Pike, Robert W.; and Atley, Robert B., 4,013,076.

Atman, Jay W. Method of forming a clad wire. 4,013,211, Cl. 228-126.000.

Aubert, Michel; and Lemercier, Guy, to Commissariat a l'Energie Atomique. Supporting device for heat-insulating panels. 4,012,879, Cl. 52-508.000.

Aufhauser, Alfred: *See—*
Irwin, Roy E.; and Aufhauser, Alfred, 4,013,541.

Auger, Arnold J. Adjustable rifle rest. 4,012,860, Cl. 42-94.000.

Austin Electronics, Inc.: *See—*
Corthell, William I., 4,013,921.

Autosonics Inc.: *See—*
Rand, Burton, 4,012,847.

Autovox S.p.A.: *See—*
Cicatelli, Rodolfo, 4,014,041.

Ayel, Michel: *See—*
Roger, Bernard; Ayel, Michel; and Debar, Francis, 4,013,337.

B. F. Goodrich Company, The: *See—*
Longi, Paolo; Cameli, Nazzareno; Parodi, Sandro; and Cervi, Remo, 4,013,823.
Powell, Joe Allen, 4,013,111.
Skillicorn, Douglas E., 4,013,710.
White, Donald Elias, 4,013,535.
White, Donald Elias, 4,013,537.

Baar, Walter; and Dolves, Jurgen, to Dr. -Ing. Rudolf Hell GmbH. Method for the production of printing forms. 4,013,829, Cl. 358-299.000.

Babbitt, John M.; and Houle, James F., to Eastman Kodak Company. Element comprising a coating layer containing a mixture of a cationic perfluorinated alkyl and an alkylphenoxy-poly(propylene oxide). 4,013,696, Cl. 428-412.000.

Babbitt, Robert P., to Marquardt Company, The. Coal gasification process. 4,013,428, Cl. 48-202.000.

Babcock, John C.; and Campbell, J. Allan, to Upjohn Company, The. Radioimmunoassay agents. 4,013,688, Cl. 260-397.450.

Babcock & Wilcox Company, The: *See—*
Long, William Gordon, 4,013,810.

Babendererde, Siegmund H. F. L. M.: *See—*
Jutte, Hans; Foik, Adolf; Babendererde, Siegmund H. F. L. M.; and Bokemeyer, Reinhard E. J., 4,012,916.

Bachner, George L.; and Bachner, Jerry G., to Nimco Corporation. Method for forming a liquid-tight flat top container. 4,012,997, Cl. 93-36.800.

Bachner, Jerry G.: *See—*
Bachner, George L.; and Bachner, Jerry G., 4,012,997.

Back, Gerhard: *See—*
Beffa, Fabio; and Back, Gerhard, 4,013,630.

Badger, James Henry: *See—*
LeBlanc, Robert Bruce; and Badger, James Henry, 4,013,813.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Kuerten, Heribert; Nagel, Otto; Sinn, Richard; Weinle, Werner; and Engler, Peter, 4,013,744.
Merkle, Hans Rupert; and Siegel, Hardo, 4,013,684.

Baer, Richard I.; and Bellivue, Kenneth M., to Safe-T-Cut Incorporated. Carton knife. 4,012,836, Cl. 30-2.000.

Bagdasarov, Khachik Saakovich; Ilin, Nikolai Pavlovich; and Starostin, Jury Alexandrovich. Apparatus for growing single crystals of high-melting oxides. 4,013,421, Cl. 23-273.0SP.

Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, to Vyzkumny ustav papieru a celulosy. Method of deinking printed wastepapers. 4,013,505, Cl. 162-5.000.

Balcom, Orville R., to Cetec Corporation. Fish locator. 4,013,991, Cl. 340-3.00C.

Ball Brothers Research Corporation: *See—*
Sherritt, Jay G.; and Eccher, Joseph A., 4,014,016.

Ballou, David G.; Bishop, Clinton L.; and Pope, Toby K., to Dayco Corporation. Endless power transmission belt structure. 4,012,962, Cl. 74-233.000.

Ballweber, Edward G.; and Phillips, Kenneth G., to Nalco Chemical Company. Process for preparing water soluble ionic polymers. 4,013,606, Cl. 260-29.4UA.

Bally Manufacturing Corporation: *See—*
Britz, John A.; and Weissman, Richard M., 4,013,157.
Balsley, Richard L.; and Faix, Louis J., to General Motors Corporation. Fuel vapor disposal means with closed control of air fuel ratio. 4,013,054, Cl. 123-136.000.
Balz, Gunther W., to Roto-Finish Company. Reciprocal finishing apparatus. 4,012,869, Cl. 51-163.200.
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., to Olinkraft, Inc. Shipping container. 4,013,168, Cl. 206-386.000.
Ban, Thomas E.; Hulette, Roger L.; and Mittra, Subir K., to McDowell-Wellman Engineering Company. Circular traveling grate sintering machine. 4,013,517, Cl. 202-262.000.
Banitt, Elden H.; and Bronn, William R., to Riker Laboratories, Inc. Derivatives of pyrrolidine and piperidine. 4,013,670, Cl. 260-295.0AM.
Banks, Robert H.: *See—*
Dewberry, Larry F.; Banks, Robert H.; and Dildy, Clell A., 4,013,992.
Bar-Akiva, Avigdor: *See—*
Beresky, Aharon; and Bar-Akiva, Avigdor, 4,013,446.
Baravalle, Vittorio: *See—*
Zavatti, Michele; Baravalle, Vittorio; and Saracino, Paolo, 4,013,603.
Barbee, Gail G., to Caterpillar Tractor Co. Pressure gauge with expansible bellows. 4,012,960, Cl. 73-410.000.
Barber-Colman Company: *See—*
Kulczycki, Karol; and Darsie, Burns, 4,013,103.
Zimmer, Darrel E.; and Brace, Paul H., 4,013,118.
Barbetta, Ludgero Raul: *See—*
Netto, Tito Livio Martins; and Barbetta, Ludgero Raul, 4,012,871.
Barrett, Carl R., Jr.; and Goldstein, Abe, to United States of America, Navy. Automatic gain control circuit for high range resolution correlation radar. 4,014,020, Cl. 343-7.0AG.
Barthels, Gottfried: *See—*
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.
Barton, Dale S.; Stoyanov, Ben; and Staats, Robert M., to NRM Corporation. Tire press unloader. 4,013,186, Cl. 214-660.000.
Barton, Lee C.: *See—*
Frantzen, John J.; and Barton, Lee C., 4,013,498.
Barton, Steven A.: *See—*
Ragano, Anthony; and Barton, Steven A., 4,013,994.
BASF Aktiengesellschaft: *See—*
Adolphi, Heinrich; Wunsch, Gerd; and Kiener, Volker, 4,013,740.
Berkel, Wilhelm; and Gettert, Hans, 4,013,431.
Denzinger, Walter; Hofmann, Ernst; and Herrle, Karl, 4,013,825.
Schoettle, Klaus; Wittkamp, Heinrich; Uhl, Karl; and Rotter, Gerhard, 4,014,042.
Volkert, Otto; Wigger, August; Zuerger, Manfred; and Richter, Peter, 4,013,806.
Bauer, Everhard. Machine for enveloping articles with plastics film. 4,012,890, Cl. 53-198.00R.
Baughman, George Washington. Golfer's positioning and retrieving device. 4,013,295, Cl. 273-162.00E.
Bausch & Lomb Incorporated: *See—*
Strange, Robert F., 4,013,158.
Baxter Travenol Laboratories, Inc.: *See—*
Jess, Thurman S., 4,013,072.
Bayer Aktiengesellschaft: *See—*
Beck, Gunther; and Heitzer, Helmut, 4,013,674.
Boden, Heinrich; and Knipp, Ulrich, 4,013,391.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,657.
Jabs, Gert; and Loew, Gunther, 4,013,701.
Lohwasser, Hermann; Nagaj, Alfred; and Wieden, Horst, 4,013,753.
Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,794.
Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, 4,013,481.
Muschelknautz, Edgar; Lenz, Hans; and Herold, Heiko, 4,012,895.
Reinehr, Ulrich; Lenz, Hans; Nogaj, Alfred; and Blankenstein, Gunter, 4,013,406.
Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,795.
Stolzer, Claus; Kramer, Wolfgang; Buchel, Karl Heinz; and Meiser, Werner, 4,013,677.
Wagner, Kuno; and Dahm, Manfred, 4,013,625.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,013,709.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,013,723.
Wolfrum, Gerhard; and Gold, Heinrich, 4,013,631.
Wollweber, Hartmund; and Flucke, Winfried, 4,013,676.
Bayer Antwerpen N.V.: *See—*
Weiler, Raoul; Leuridan, Joel; and Renier, Jozef, 4,013,755.
BBC Brown, Boveri & Cie: *See—*
Herzig, Karl-Heinz, 4,013,826.
Beach, James Robert: *See—*
Mason, Richard Storrs; Bible, Robert Edward; and Beach, James Robert, 4,013,208.
Beaudet, Didier M.: *See—*
Berniere, Michel G.; and Beaudet, Didier M., 4,012,870.
Beck, Charles K.: *See—*
Foote, Francis C.; and Beck, Charles K., 4,013,894.
Beck, Gunther; and Heitzer, Helmut, to Bayer Aktiengesellschaft. N-(1,2,2,2-tetrachloroethyl)-formimide-chloride for synthesizing trichlorothiazole. 4,013,674, Cl. 260-302.00R.
Becker, Charles J.: *See—*
Burke, Richard J.; and Becker, Charles J., 4,013,360.
Becker, Wilfried: *See—*
Germershausen, Raimond; and Becker, Wilfried, 4,012,986.
Beckman, Maynard K., Jr., to Xerox Corporation. Adjustable forms guide. 4,013,362, Cl. 355-75.000.
Beckmann, Oskar, to Siemens Aktiengeselischaft. Circuit for controlling a semi-conductor valve. 4,014,003, Cl. 340-171.00R.
Bedel, Denis E.: *See—*
Mandel, Alan F.; Frask, Theodore E.; and Bedel, Denis E., 4,013,993.
Beecher, Gary R.: *See—*
Stewart, Kent K.; Beecher, Gary R.; and Hare, Peter Edgar, 4,013,413.
Beffa, Fabio; and Back, Gerhard, to Ciba-Geigy Corporation. Chromium complex disazo dyes. 4,013,630, Cl. 260-145.00A.
Begey, Jean-Marie; and Neau, Alain, to Garcia Corporation. Ski-binding with an adjustable toe or heel hold-down loop. 4,013,304, Cl. 280-618.000.
Behnke, Horst, to Daimler-Benz Aktiengesellschaft. Diagnostic apparatus. 4,013,334, Cl. 339-113.00R.
Behrens, Hermann W.; Grohs, Gerhard L.; and Dailey, Charles L., to TRW Inc. Aerodynamic window for chemical laser. 4,013,977, Cl. 331-94.50D.
Bell, Arthur Stewart, to Telstop S.A. System for monitoring dialled telephone numbers. 4,013,839, Cl. 179-7.00R.
Bell & Howell Company: *See—*
Tress, Norwood E.; and Orsinger, Winston A,. 4,013,283.
Bell Telephone Laboratories, Incorporated: *See—*
Bonyhard, Peter Istvan; Chen, Yu-Ssu; and Smith, James Lanson, 4,014,009.
Dufft, William Henry, 4,013,915.
Judice, Charles Norris, 4,013,828.
Kakalec, Robert John, 4,013,900.
Kao, Chih-Yu; and Kurth, Carl Ferdinand, 4,013,842.
Kogelnik, Herwig Werner, 4,013,000.
Van Uitert, Le Grand Gerard; and Zydzik, George John, 4,013,501.
Bellivue, Kenneth M.: *See—*
Baer, Richard I.; and Bellivue, Kenneth M., 4,012,836.
Bellus, Daniel; and Fory, Werner, to Ciba-Geigy Corporation. 1-(Bistrifluoromethylphenyl)-2-oxo-pyrrolidine-4-carboxylic acid derivatives, their production and their use as plant-growth regulators and herbicides. 4,013,445, Cl. 71-76.000.
Belsole, Susan C.: *See—*
Eichman, Martin L.; and Belsole, Susan C., 4,013,792.
Bendix Corporation, The: *See—*
Anderson, Bruce W., 4,013,147.
Deem, Brian C.; Pataky, Gilbert A.; and Thompson, George W., 4,013,954.
Devine, John A., 4,013,990.
Benerito, Ruth R.: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,013,493.
Benigni, Italiana, to Ital-Rubber S.r.l. Apparatus for supporting a tire while a strip of premolded tread is being applied thereto in order to reconstruct the tread on the said tire. 4,013,499, Cl. 156-394.000.
Bennett, Gregory B., to Sandoz, Inc. 3-Pyridyl and pyridyl-N-oxide-furo[3,4-e]-as-triazines. 4,013,767, Cl. 424-249.000.
Benson, Everett H. Locks. 4,012,930, Cl. 70-234.000.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, to Richardson-Merrell Inc. Growth promotion. 4,013,762, Cl. 424-242.000.
Benya, John A.; and McGuffey, Gale W., to United States of America, Navy. Pressure insensitive system for measuring the length of a cable deployed underwater using magnet actuated reed switches. 4,013,944, Cl. 324-34.00L.
Benzaquen, Jose, to Benzaquen, Sociedad Anonima, Industrial, Comercial, Immobiliaria y Financiera. Apparatus for abrading fabrics. 4,012,815, Cl. 26-28.000.
Benzaquen, Sociedad Anonima, Industrial, Comercial, Immobiliaria y Financiera: *See—*
Benzaquen, Jose, 4,012,815.
Berdahl, James Maynard: *See—*
Farhadieh, Bahram; and Berdahl, James Maynard, 4,013,820.
Berecoechea, Jean: *See—*
Anatol, Jesus; and Berecoechea, Jean, 4,013,706.
Berend, Steven P.; and Giardina, Carmelo. Inflatable shoe. 4,012,854, Cl. 36-29.000.
Beresky, Aharon; and Bar-Akiva, Avigdor, to Fertilizers & Chemicals Ltd. Method for preventing creasing in citrus fruit. 4,013,446, Cl. 71-86.000.
Berger, Allan H. Fuel tank and battery combination structure. 4,013,300, Cl. 280-5.00A.
Berger, Wolfgang; and Rottger, Hans, to Siemens Aktiengesellschaft. Steam generator, tube-bundle centering arrangement. 4,013,121, Cl. 165-162.000.
Berghausen, Alfred, III: *See—*
Hoppert, Bruce Noel; and Berghausen, Alfred, III, 4,013,519.
Bergische Stahl-Industrie: *See—*
Klein, Willi; Rocholl, Henning; and Naydowski, Reinhard, 4,013,175.
Bergsoe, Svend, to Paul Bergsoe & Son a/s. Method for treating flue dust containing lead. 4,013,456, Cl. 75-77.000.

Bergstrand, Gunnar Magnus. Means for testing containers for leakage. 4,012,945, Cl. 73-49.200.

Bergthaller, Peter; Himmelmann, Wolfgang; and Schranz, Karl-Wilhelm, to AGFA-Gevaert, A.G. Method of hardening a protein-containing layer of a silver halide photographic material with an alkyl ester of 1,2-dihydroquinoline-N-carboxylic acid. 4,013,468, Cl. 96-50.0PT.

Berkel, Wilhelm; and Gettert, Hans, to BASF Aktiengesellschaft. Partial or complete separation of gas mixtures, containing ammonia and carbon dioxide. 4,013,431, Cl. 55-70.000.

Berkowitz, Sidney; and Juelke, Charles V., to FMC Corporation. High pressure thermal hydrolysis process to decompose triazines in acid waste streams. 4,013,757, Cl. 423-358.000.

Berniere, Michel G.; and Beaudet, Didier M. Apparatus for measuring and changing vibration frequency of metal B. 4,012,870, Cl. 51-165.00R.

Bernstein, David H.: *See—*
Sorensen, Karsten; Bernstein, David H.; and Druke, Michael B., 4,014,006.

Bertele, Ludwig; and Hildebrand, Klaus W., to Wild Heerbrugg Aktiengesellschaft. Wide-angle objective. 4,013,349, Cl. 350-214.000.

Berton, Paul W.: *See—*
Beswick, Paul R.; Berton, Paul W.; Ganem, Charles F.; and Johnson, Clark E., Jr., 4,013,239.

Bescond, Francois Joseph Marie, to U.S. Philips Corporation. Display device. 4,013,344, Cl. 350-160.0LC.

Beseke, Kermit Myles; Ramsland, David Gordon; and Stedman, Robert Bruce, to Motorola, Inc. Improved receiver selecting (voting) system. 4,013,962, Cl. 325-304.000.

Bestenreiner, Friedrich; Giglberger, Dieter; and Weidkuhn, Gert, to AGFA-Gevaert, A.G. Apparatus for developing electrostatic images with liquid toner. 4,013,356, Cl. 355-10.000.

Beswick, Paul R.; Berton, Paul W.; Ganem, Charles F.; and Johnson, Clark E., Jr., to Micro Communications Corporation. Continuous loop tape cassette. 4,013,239, Cl. 242-55.19A.

Betka, Harold Anthony, to Abbott Laboratories. Hanger construction for semirigid plastic container. 4,013,187, Cl. 215-100.00A.

Betzer, Peter R.; and Eggimann, Donald. Digestion bomb. 4,013,419, Cl. 23-259.000.

Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Schrenk, Heinrich Maria, to Canada Packers Limited; and Institute of Microbiology and Hygiene of the University of Montreal, The. Antiviral 5-(substituted benzal) hydantoins. 4,013,770, Cl. 424-273.000.

Bhate, Suresh K.: *See—*
Lang, Walter W.; Wafer, John A.; Bratkowski, Walter V.; and Bhate, Suresh K., 4,013,926.

Bianchetti, Alberto: *See—*
Riva, Mario; Toscano, Luciano; Grisanti, Giampiero; and Bianchetti, Alberto, 4,013,679.

Bianchetti, Giuseppe; Pocar, Donato; and Stradi, Riccardo, to Societa' Italiana Resine S.I.R. S.p.A. Herbicidal composition and method. 4,013,441, Cl. 71-92.000.

Bible, Robert Edward: *See—*
Mason, Richard Storrs; Bible, Robert Edward; and Beach, James Robert, 4,013,208.

Biddle, Arthur; and Clonts, Alpheus Eugene. Aqueous natural resinoid compositions. 4,013,479, Cl. 106-133.000.

Bieri, Hans. Apparatus with a motor-driven material removing tool, especially for cutting concrete, stone or the like. 4,013,133, Cl. 173-32.000.

Biess, John; and Yu, Yuan, to TRW Inc. Multiple feedback control apparatus for power conditioning equipment. 4,013,939, Cl. 323-17.000.

Bilan, Peter: *See—*
Smrekar, Donald E.; Bilan, Peter; and Hamilton, James, 4,012,992.

Biomedix A.G.: *See—*
Raffaele, Italo, 4,013,417.

Birnkraut, Hans-Walter: *See—*
Feichtinger, Hans; Birnkraut, Hans-Walter; Lutze, Siegfried; Payer, Wolfgang; and Schnier, Dieter, 4,013,822.

Bishop, Clinton L.: *See—*
Ballou, David G.; Bishop, Clinton L.; and Pope, Toby K., 4,012,962.

Bisson, Bernard Joseph; and White, Loren Hawdon, to United Technologies Corporation. Coolable blade tip shroud. 4,013,376, Cl. 415-117.000.

Bittner, Klaus-Jurgen: *See—*
Gerigk, Gunter; Bittner, Klaus-Jurgen; and Kostner, Armin, 4,013,099.

BJD Industries, Inc.: *See—*
Darling, Myron E., 4,013,110.

Bjerk, Roger O., to Caterpillar Tractor Co. Dynamic air bearing seal for engine crankshaft. 4,013,298, Cl. 277-75.000.

Black, Stanley D., to Wade Industries, Inc. Double lock tufting button. 4,012,812, Cl. 24-90.00B.

Blankenstein, Gunter: *See—*
Reinehr, Ulrich; Lenz, Hans; Nogaj, Alfred; and Blankenstein, Gunter, 4,013,406.

Blasche, Thomas L., Jr.; Kobbeman, Donald D.; and Corley, Boyce M., to Rockwell International Corporation. Spiral grain solid propellant fabrication process. 4,013,743, Cl. 264-3.00R.

Blau KG Fabrik fur Kraftfahrzeugteile: *See—*
Gerdes, Theodor, 4,013,191.

Bleh, Otto, deceased: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Morgenstern, Dieter, 4,013,656.

Bleh, Rita: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Morgenstern, Dieter, 4,013,656.

Blitz, Daniel, to Sanders Associates, Inc. Solar energy sun tracker. 4,013,885, Cl. 250-203.00R.

Blom, Rolf Helge; Forshufvud, Sten Harald Ragnar; and Skagerlund, Lars-Erik, to AB Bofors. Device for controlling the power of an optical guidance beam. 4,013,244, Cl. 244-3.130.

Bludworth, Robert A. Ocean going push-towing combination. 4,013,032, Cl. 114-248.00R.

Blumberg, Shmaryahu: *See—*
Goldstein, Leon; Katzir (Katchalski), Ephraim; Levin, Yehuda; and Blumberg, Shmaryahu, 4,013,511.

Boden, Heinrich; and Knipp, Ulrich, to Bayer Aktiengesellschaft. Mixing apparatus combined with a molding tool. 4,013,391, Cl. 425-145.000.

Boehringer Mannheim G.m.b.H.: *See—*
Rittersdorf, Walter; Guthlein, Werner; Werner, Wolfgang; Rey, Hanz-Georg; and Rieckmann, Peter, 4,013,416.

Boeing Company, The: *See—*
Giffin, Leverett William, 4,013,247.
Jones, Everett E., 4,013,865.
Kristoffersen, Bjorn R., 4,012,797.

Boer, Jort, to Stork Amsterdam B.V. Installation for the thermal treatment of objects. 4,013,162, Cl. 198-409.000.

Bofors America, Inc.: *See—*
Abbondante, Cosmo, 4,013,851.

Bogdanowicz, Mitchell Joseph, Jr., to Du Pont de Nemours, E. I., and Company. Method of making 4-amino-6-t-butyl-3-mercapto-1,2,4-triazin-5-one. 4,013,649, Cl. 260-248.0AS.

Boham, Ambrose C.; Davies, John C.; and Kendall-Smith, Brian J., to British Industrial Plastics Limited. Extruders and injection moulding machines. 4,013,276, Cl. 259-191.000.

Bokemeyer, Reinhard E. J.: *See—*
Jutte, Hans; Foik, Adolf; Babendererde, Siegmund H. F. L. M.; and Bokemeyer, Reinhard E. J., 4,012,916.

Bolding, Richard D. Wave-powered pneumatic system for power generation. 4,013,379, Cl. 417-100.000.

Boleky, Edward J.; and Scott, Charles, to Intel Corporation. High density CMOS process. 4,013,484, Cl. 148-1.500.

Bonanno, Anthony J.: *See—*
Greenfield, Charles; Casparian, Robert E.; and Bonanno, Anthony J., 4,013,516.

Bonavent, Gerard: *See—*
Thiery, Jean; Chatard, Michel; Bonavent, Gerard; and Huvey, Michel, 4,013,100.

Bonyhard, Peter Istvan; Chen, Yu-Ssu; and Smith, James Lanson, to Bell Telephone Laboratories, Incorporated. Magnetic bubble propagate arrangement. 4,014,009, Cl. 340-174.0TF.

Borg-Warner Corporation: *See—*
Kelbel, Donald W., 4,012,968.

Born, William F., to Westinghouse Electric Corporation. Fusible electric control device. 4,013,989, Cl. 337-227.000.

Bornmann, Robert Edward; Cowan, John Richard; and Schneider, Mark Joel, to International Telephone and Telegraph Corporation. Digital multiplier. 4,013,879, Cl. 235-164.000.

Borrod, Guy: *See—*
Poignant, Pierre; Borrod, Guy; and Richard, Raymond, 4,013,451.

Boshnyaga, Valery Anatolievich; Kalinin, Lev Pavlovich; and Postolaty, Vitaly Mikhailovich. Phase shifter. 4,013,942, Cl. 323-119.000.

Bosshard, Alfred: *See—*
Delfosse, Pierre; and Bosshard, Alfred, 4,013,602.

Bottner, Gunter: *See—*
Fromme, Hans-Georg; and Bottner, Gunter, 4,013,015.

Bouchaudon, Jean; Bourat, Guy; and Margraff, Rodolphe, to Rhone-Poulenc S.A. Polyoxetanes which can be used in peptide synthesis. 4,013,565, Cl. 210-500.00M.

Boundy, Bruce K.; and Munsey, Robert J., to Westinghouse Electric Corporation. Mounting clip lock. 4,013,254, Cl. 248-243.000.

Bourat, Guy: *See—*
Bouchaudon, Jean; Bourat, Guy; and Margraff, Rodolphe, 4,013,565.

Bourgeois, Ronald D., to Custom Fabricators, Inc. Conveyor support structure. 4,013,167, Cl. 198-861.000.

Bourgery, Guy R.: *See—*
Fauran, Claude P.; Eberle, Jeannine A.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,013,768.

Bowles, Arnold G.: *See—*
Witkin, Donald E.; and Bowles, Arnold G., 4,013,394.

Brace, Paul H.: *See—*
Zimmer, Darrel E.; and Brace, Paul H., 4,013,118.

Bracke, William J. I.; and Brandli, Jacqueline, to Labofina S.A. Post-treatment of copolymer of styrene and acrylonitrile. 4,013,739, Cl. 260-880.00R.

Brackenridge, David R., to Ethyl Corporation. Process for halogenating a bisphenol. 4,013,728, Cl. 260-619.00A.

Bradley, Donald A., to Speedcall Corporation. Addressable signalling apparatus having master calling feature with output latches and wrong digit reject. 4,014,001, Cl. 340-147.0MD.

Brandenstein, Manfred: *See—*
Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, 4,013,327.
Brandli, Eugene Howard: *See—*
Liebowitz, Marvin; and Brandli, Eugene Howard, 4,013,475.
Brandli, Jacqueline: *See—*
Bracke, William J. I.; and Brandli, Jacqueline, 4,013,739.
Brando, Pasquale: *See—*
Rosa, Giovanni; Morelli, Claudio; Brando, Pasquale; and Daghetti, Giuseppe, 4,012,919.
Brandstrom, Karl Ivar, to AB Bofors. Device for inserting or removing a hot blank in a drop hammer. 4,012,938, Cl. 72-422.000.
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., to Datotek, Inc. Voice security method and system. 4,013,837, Cl. 179-1.50S.
Brass, Robert L.; Venditti, Arthur P.; and Kjellman, Samuel T., to Brass, Robert L. Game with detector assembly providing a stored indication of the passage of the assembly over a magnet concealed in a game board. 4,013,291, Cl. 273-130.00A.
Bratkowski, Walter V.: *See—*
Lang, Walter W.; Wafer, John A.; Bratkowski, Walter V.; and Bhate, Suresh K., 4,013,926.
Bratton, William Lee, to Whirlpool Corporation. Lift truck attachment. 4,013,185, Cl. 214-621.000.
Braukmann Armaturen AG: *See—*
Braukmann, Heinz Werner, 4,013,089.
Gocke, Eberhard; and Vollmer, Rudolf, 4,013,088.
Braukmann, Heinz Werner, to Braukmann Armaturen AG. Back flow preventer valve. 4,013,089, Cl. 137-218.000.
Braverman, Leslie, to Solo Products Corporation. Hanger bracket for merchandise. 4,013,252, Cl. 248-220.400.
Breeze Corporations, Inc.: *See—*
Laky, Elmer; and Walsh, Ralph, 4,013,270.
Breneman, Richard; and Parry, Dwight L., to Exxon Nuclear Company, Inc. Remote acoustic probe. 4,013,905, Cl. 310-8.300.
Brevatome: *See—*
Granger, Rene; Labsley, Alain; and Rolland, Serge, 4,013,591.
Briar, Thomas J., to PPG Industries, Inc. Method and apparatus for preparing container packages of glass strand. 4,013,433, Cl. 65-2.000.
Bridgestone Tire Company Limited: *See—*
Masuda, Kinji; Saigo, Hideaki; Naito, Kazuo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,013,817.
Briggs & Stratton Corporation: *See—*
Uuskallio, Arvo Foster, 4,013,105.
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, to Dynamit Nobel Aktiengesellschaft. Process for the extrusion of a plastic foil having small variations in thickness. 4,013,745, Cl. 264-37.000.
Bristol-Myers Company: *See—*
Crenshaw, Ronnie Ray; Luke, George Michael; and Siminoff, Paul, 4,013,665.
Horning, Donald E.; Morris, Leeson R.; and Douglas, James L., 4,013,648.
Weintraub, Leonard; and Rosenberg, Allan H., 4,013,785.
British Hartford-Fairmont Limited: *See—*
Vlk, Petr, 4,013,439.
British Industrial Plastics Limited: *See—*
Boham, Ambrose C.; Davies, John C.; and Kendall-Smith, Brian J., 4,013,276.
British Petroleum Company Limited, The: *See—*
Lainchbury, David Lindsay Guy; and Preedy, John Edward, 4,012,867.
Britz, John A.; and Weissman, Richard M., to Bally Manufacturing Corporation. Bonus play machine. 4,013,157, Cl. 194-1.00N.
Broadway, Alexander Richard William; Fong, William; and Rawcliffe, Gordon Hindle, to National Research Development Corporation. Electric motors. 4,013,909, Cl. 310-180.000.
Broberg, Dewey O., Jr. Connector clip. 4,013,336, Cl. 339-253.00R.
Brogan, Darryl Keefer; Haskins, Paul Leon; and Lindner, Robert George, to H. H. Robertson Company. Protective cover assembly for underfloor access housing. 4,012,874, Cl. 52-99.000.
Brokaw, William Henley. Method of root stock propagation. 4,012,866, Cl. 47-6.000.
Brolund, Theodore F., to W. A. Whitney Corporation. Punch press for duplicating workpieces. 4,012,976, Cl. 83-146.000.
Bronn, William R.: *See—*
Banitt, Elden H.; and Bronn, William R., 4,013,670.
Brouard, Claude Marie Henri Emile: *See—*
Stiot, Jean-Pierre Henri; Leroy, Jean-Marie Louis; and Brouard, Claude Marie Henri Emile, 4,013,632.
Broughton, Lewis, to National Research Development Corporation. Dispersion of pigments by cryogenic attrition. 4,013,232, Cl. 241-3.000.
Brown, Charles M.; and Brown, Harry J., to Union Carbide Corporation. Process for preparing cemented tungsten carbide. 4,013,460, Cl. 75-204.000.
Brown, Cicero C., deceased; and by Brown, Joe R., executor. Pipe racker. 4,013,178, Cl. 214-2.500.
Brown, Dorvin. Methods and solutions for improvement of offset printing. 4,013,008, Cl. 101-451.000.
Brown, Harry J.: *See—*
Brown, Charles M.; and Brown, Harry J., 4,013,460.
Brown, Joe R., executor: *See—*
Brown, Cicero C., deceased; and Brown, Joe R., executor, 4,013,178.
Brown, Melancthon S., deceased (by Kohn, Gustave K., special administrator); and Kohn, Gustave K., to Chevron Research Company. Insecticidal N-thio-substituted carbamates of dihydrobenzofuranols. 4,013,774, Cl. 424-285.000.
Brown, Raymond E., to Monsanto Company. Segmented light emitting diode deflector segment. 4,013,916, Cl. 313-510.000.
Brown, Richard E., to Xerox Corporation. Indolobenzoxazepines. 4,013,641, Cl. 260-239.30P.
Brown, Richard E., to Warner-Lambert Company. Indolobenzoxazepines. 4,013,660, Cl. 260-268.0PC.
Brown, Richard E.; and Shavel, John, Jr., to Warner-Lambert Company. Substituted benzopyrano[3,4-c]pyridines and process for their preparation. 4,013,671, Cl. 260-295.00T.
Brown, Richard E.; and Lustgarten, David M., to Warner-Lambert Company. Substituted 2-aminothiochromones. 4,013,771, Cl. 424-275.000.
Brown, Richard J., to Eaton Corporation. Mounting nut retention for fluid couplings. 4,013,154, Cl. 192-58.00B.
Brown, Richard N., to General Electric Company. Measuring dispenser. 4,013,199, Cl. 222-438.000.
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Process for preparing heterocyclialkylthioalkyl-N-cyanoguanidines. 4,013,678, Cl. 260-309.000.
Brown, Vincent B., to Methode Electronics, Inc. Power pack plug switch. 4,013,849, Cl. 200-51.090.
Bruhn, Gustav: *See—*
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.
Bucalo, Louis. Implant for reversibly preventing conception. 4,013,063, Cl. 128-1.00R.
Bucciarelli, Tullio; and Picardi, Giovanni. System to render constant the probability of false alarm in radar signals converted into numerical form. 4,013,998, Cl. 340-146.200.
Buchanan, Thomas: *See—*
Crayton, William James, 4,012,907.
Buchel, Karl Heinz: *See—*
Stolzer, Claus; Kramer, Wolfgang; Buchel, Karl Heinz; and Meiser, Werner, 4,013,677.
Buck, Carl J., to Johnson & Johnson. Cyanoacrylic acid adducts. 4,013,703, Cl. 260-464.000.
Buckbee-Mears Company: *See—*
Frantzen, John J.; and Barton, Lee C., 4,013,498.
Bull, Dale L., to Nartron Corporation. Turn signal assembly and self-cancelling means attachable externally to a steering column post. 4,013,850, Cl. 200-61.270.
Bunker Ramo Corporation: *See—*
Enright, Wayne Jay, 4,012,900.
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, to Snam Progetti S.p.A. Process for the preparation of materials having improved mechanical properties and materials obtained thereby. 4,013,589, Cl. 252-455.00R.
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, to Snam Progetti S.p.A. Process for preparing materials having improved mechanical and thermal properties and materials obtained thereby. 4,013,590, Cl. 252-455.00R.
Burdzgla, Mikhail Erastovich: *See—*
Dvali, Rafael Rafaelovich; Margvelashvili, Otar Vladimirovich; Nozadze, Alexei Dmitrievich; Burdzgla, Mikhail Erastovich; and Melitauri, Alexandr Nikolaevich, 4,013,884.
Burke, Richard J.; and Becker, Charles J., to American Videonetics Corporation. Information storage system. 4,013,360, Cl. 355-27.000.
Burkett, Richard O., to Westinghouse Air Brake Company. Remote control brake system for a railway train. 4,013,323, Cl. 303-20.000.
Burkhalter, John E.; and Sforzini, Richard H., to United States of America, Army. Dual combustion missile system. 4,012,987, Cl. 89-1.701.
Burkl, Erich: *See—*
Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, 4,013,327.
Burlamacchi, Pio; Pratesi, Riccardo; and Vanni, Umberto, to Consiglio Nazionale delle Richerche. Lasers and photocoagulators. 4,013,978, Cl. 331-94.50L.
Burleigh, John E.: *See—*
Uraneck, Carl A.; and Burleigh, John E., 4,013,824.
Burough, Irvin G.: *See—*
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., 4,013,260.
Burov, Igor Sergeevich; Bysjuk, Vladimir Vladimirovich; Mosse, Alfred Lvovich; Shkurko, Leonid Stepanovich; and Vashkevich, Vyacheslav Andreevich. Plasma-chemical reactor for treatment of disperse materials. 4,013,415, Cl. 23-252.00R.
Burrell, Dale F.; and Strihafka, Alan, to Burrellco, Inc. Roll-fed sheet printing apparatus. 4,013,006, Cl. 101-227.000.
Burrellco, Inc.: *See—*
Burrell, Dale F.; and Strihafka, Alan, 4,013,006.
Burysek, Frantisek; Mikulecky, Karel; and Havranek, Zdenek, to Vyzkumny ustav Bavlnarsky. Cop tube holder for winding yarns or threads on textile machines. 4,013,242, Cl. 242-129.510.
Bush, Anthony Harry, to A. H. B. Services (Engineers) Limited. Conveyors. 4,013,165, Cl. 198-817.000.

Bushick, Ronald D., to Suntech, Inc. Ammoxidation process for making dicyanonaphthalene. 4,013,705, Cl. 260-465.00C.

Bushnell, James D., to Exxon Research and Engineering Company. Lube extraction with NMP/phenol/water mixtures. 4,013,549, Cl. 208-323.000.

Butler, Blondie: *See—*
King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,012,801.

Butterworth Hydraulic Developments Limited: *See—*
Butterworth, Philip, 4,012,995.

Butterworth, Philip, to Butterworth Hydraulic Developments Limited. Assemblies which comprise axially slidable pistons/spools. 4,012,995, Cl. 92-152.000.

Byrd, Carlisle O., Jr., to J. T. Thorpe Company. Prefabricated insulating structure for insulating a corner in a furnace. 4,012,877, Cl. 52-275.000.

Bysjuk, Vladimir Vladimirovich: *See—*
Burov, Igor Sergeevich; Bysjuk, Vladimir Vladimirovich; Mosse, Alfred Lvovich; Shkurko, Leonid Stepanovich; and Vashkevich, Vyacheslav Andreevich, 4,013,415.

C.G. Conn, Ltd.: *See—*
Southard, James S., 4,012,982.

Cabaraux, Emile, to Solvay & Cie. Electrolytic cell. 4,013,536, Cl. 204-252.000.

Calamani, Sergio; Turri, Eugenio; and Savio, Ermanno. Device for controlling the balloon and tension in the thread from a thread storing and distributing apparatus to an operating machine. 4,013,238, Cl. 242-47.010.

Calandra, Anthony Louis. Apparatus and method for damming a pipeline. 4,013,097, Cl. 138-93.000.

California Institute of Technology: *See—*
Rembaum, Alan, 4,013,507.

Callos, John G.: *See—*
Ferrin, Albert William; and Callos, John G., 4,013,171.

Calvert, Rodney K.; and Scott, Dale K., to Mead Corporation, The. Packaging machine. 4,012,887, Cl. 53-48.000.

Cameli, Nazzareno: *See—*
Longi, Paolo; Cameli, Nazzareno; Parodi, Sandro; and Cervi, Remo, 4,013,823.

Cameron, John Kent, to Kenney Manufacturing Company. Pulley and support combination. 4,012,961, Cl. 74-230.700.

Campbell, J. Allan: *See—*
Babcock, John C.; and Campbell, J. Allan, 4,013,688.

Campbell, Kenneth J., to United States of America, Navy. FM RF signal generator using step recovery diode. 4,013,966, Cl. 325-363.000.

Campos, Jose G.: *See—*
Lombana, Luis A.; and Campos, Jose G., 4,013,023.

Canada Packers Limited: *See—*
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Schrenk, Heinrich Maria, 4,013,770.

Canadian International Paper Company: *See—*
Histed, John A.; Lawford, William H.; and McLeod, Murray J., 4,013,506.

Canfield, Carl Rex, Jr. Multiple exposure camera take-up spool. 4,014,035, Cl. 354-209.000.

Canon Kabushiki Kaisha: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,013,354.
Yamada, Yu, 4,013,348.

Cantley, George A.; and Litzell, John E., to Incom International Inc. Steering control device. 4,013,034, Cl. 116-31.000.

Carignan, Eugene, to Lawrence Peska Associates, Inc. Flow meter. 4,012,956, Cl. 73-201.000.

Carter, Thomas M., to Veda, Inc. Material spreader. 4,013,224, Cl. 239-148.000.

Cartier, Jean-Pierre L.; and Senet, Jean-Pierre G., to Societe Nationale des Poudres et Explosifs. Process for the purification of polycarbonates. 4,013,702, Cl. 260-463.000.

Carus, Bryce W.: *See—*
Dinkelkamp, Henry T.; Carus, Bryce W.; and Norman, Robert J., 4,013,053.

Cash, David R., to James Cash Machine Co. Dual sewing head serging machine. 4,013,027, Cl. 112-155.000.

Casparian, Robert E.: *See—*
Greenfield, Charles; Casparian, Robert E.; and Bonanno, Anthony J., 4,013,516.

Cassat, Robert, to Rhone-Poulenc Industries. Aqueous compositions of polyimides containing hetero-polysaccharide. 4,013,600, Cl. 260-17.4ST.

Castrantas, Harry Marcus; and Gresham, John T., to FMC Corporation. Dry cleaning with peracids. 4,013,575, Cl. 252-104.000.

Caterpillar Tractor Co.: *See—*
Barbee, Gail G., 4,012,960.
Bjerk, Roger O., 4,013,298.
Hein, Allyn J.; McMillan, William D.; and Ruseff, Walter Z., 4,013,381.
Wirt, Leon A.; and Rhoads, Kenneth A., 4,013,130.

Catlett, John C., to Kelley Company, Inc. Electromechanically operated dockboard. 4,012,804, Cl. 14-71.300.

Caudel, Edward R., to Texas Instruments Incorporated. Segment scanning method for calculator display system. 4,014,012, Cl. 340-336.000.

Cawse, James N., to Union Carbide Corporation. Catalytic process for polyhydric alcohols and derivatives. 4,013,700, Cl. 260-449.00R.

Cayre, Rene H.: *See—*
Claude, Pierre M. R.; Gencey, Robert E.; Mottry, Jean-Paul; and Cayre, Rene H., 4,013,009.

Cella, John A.; Fiebig, August Emil, Jr.; and Pum, Franz J., to Alberto Culver Company. Hair creme rinses and hair conditioners containing hydrophobic-lipophobic perfluorinated compounds. 4,013,786, Cl. 424-70.000.

Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., to Pfizer Inc. Mixture of antibiotics produced by new species of micromonospora. 4,013,789, Cl. 424-115.000.

Centre Electronique Horloger S.A.: *See—*
Vittoz, Eric, 4,013,979.

Centre Technique du Bois: *See—*
Guillerm, Jean; and Fondronnier, Jacques, 4,013,108.

Cervi, Remo: *See—*
Longi, Paolo; Cameli, Nazzareno; Parodi, Sandro; and Cervi, Remo, 4,013,823.

Cessna Aircraft Company, The: *See—*
Vesel, Andrew M., 4,014,025.

Cetec Corporation: *See—*
Balcom, Orville R., 4,013,991.

Cetenko, Wiaczeslaw A.: *See—*
Morrison, Glenn C.; and Cetenko, Wiaczeslaw A., 4,013,778.

CGR Medical Corporation: *See—*
Horsey, William Charles, 4,013,019.

Chan, Kwok Yan, to W. Haking Industries, Ltd. Percussive flash unit operating mechanism. 4,014,033, Cl. 354-142.000.

Chang, Clarence D.; and Lang, William H., to Mobil Oil Corporation. Conversion of methanol to gasoline with minimum durene production. 4,013,732, Cl. 260-668.00R.

Chang, Te-Hsing. Wire connector. 4,013,333, Cl. 339-98.000.

Change, Nicholas D.; and Riggs, Michael T., to PCB Piezotronics, Inc. Conformal pressure transducer. 4,012,940, Cl. 73-4.00R.

Chatard, Michel: *See—*
Thiery, Jean; Chatard, Michel; Bonavent, Gerard; and Huvey, Michel, 4,013,100.

Chemetron Corporation: *See—*
Smith, Robert L., 4,013,297.

Chemtrust Industries Corporation: *See—*
Schneider, Barry L., 4,013,228.

Chen, Yu-Ssu: *See—*
Bonyhard, Peter Istvan; Chen, Yu-Ssu; and Smith, James Lanson, 4,014,009.

Cheney, George T., to Nashua Corporation. Magnet ring configuration and disc cartridge including magnet ring configuration. 4,013,169, Cl. 206-444.000.

Cheng, Paul J., to Phillips Petroleum Company. Carbon black reactor. 4,013,420, Cl. 23-259.500.

Chevron Research Company: *See—*
Brown, Melancthon S., deceased; and Kohn, Gustave K., 4,013,774.
Hutchison, Stanley O.; and Mitchell, Neal L., 4,013,124.
Katsumoto, Kiyoshi; and Wuopio, Richard A., 4,013,626.
Mitchell, Neal L., 4,013,123.

Chicago Bridge & Iron Company: *See—*
Stafford, Donald Claude, 4,013,030.

Chick, Raymond F., to Westinghouse Electric Corporation. Darlington transistor switching circuit for reactive load. 4,013,904, Cl. 307-315.000.

Child, Terence Frederick; and Davies, James Francis, to Lever Brothers Company. Detergent ingredient. 4,013,578, Cl. 252-140.000.

Chiles, William E.; Vetsch, LeRoy E.; and Peterson, Jack V., to Eldec Corporation. Shrouded flowmeter turbine and improved fluid flowmeter using the same. 4,012,957, Cl. 73-231.00R.

Chisso Corporation: *See—*
Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, 4,013,430.

Chisso Engineering Co. Ltd.: *See—*
Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, 4,013,430.

Chitayat, Anwar; and Squires, Stanley J. Workpiece positioning table. 4,013,280, Cl. 269-60.000.

Chiu, Ying C.; and Hill, Harold J., to Shell Oil Company. Aqueous anionic surfactant systems containing aromatic ether polysulfonates. 4,013,569, Cl. 252-8.55D.

Chmela, John F. Combing device. 4,013,086, Cl. 132-110.000.

Chodorow, Marvin: *See—*
Kompfner, Rudolf; Chodorow, Marvin; and Lemons, Ross A., 4,012,950.

Chou, Doris H.: *See—*
Chou, Jack; and Chou, Doris H., 4,013,943.

Chou, Jack; and Chou, Doris H. Solid state electrolytic cell gas sensor head. 4,013,943, Cl. 324-33.000.

Christensen, Gunnar Buhl; and Thastrup, Ove, to A/S E. Rasmussen. Methods and means for detecting the presence of moisture adjacent insulated pipes. 4,013,924, Cl. 361-49.000.

Chrysler Corporation: *See—*
Nogle, Thomas Dushane, 4,012,904.

Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive materials. 4,013,528, Cl. 204-158.00R.

Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation. Process for preparation of solid phase dispersion of photoconductive materials. 4,013,529, Cl. 204-158.00R.

Chu, Joseph Y. C.; and Gunther, W. H. H., to Xerox Corporation.

Process for preparation of solid phase dispersion of photoconductive materials. 4,013,530, Cl. 204-158.00R.

Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., to Dow Chemical Company, The. Cellulosic sizing agents. 4,013,480, Cl. 106-213.000.

Chung, Yun-Hoon, to International Automated Machines, Inc. Packaging machine. 4,012,889, Cl. 53-183.000.

Ciba-Geigy Corporation: *See—*
Beffa, Fabio; and Back, Gerhard, 4,013,630.
Bellus, Daniel; and Fory, Werner, 4,013,445.
Fechtig, Bruno, 4,013,650.
Haas, Georges; Ferrini, Pier Giorgio; and Rossi, Alberto, 4,013,708.
Haas, Georges; Jaques, Roland; Rossi, Alberto; and Ruegg, Martin, 4,013,719.
Knell, Martin, 4,013,621.
Liechti, Hans Wilhelm; and Defago, Raymond, 4,013,408.
Lohse, Friedrich; Munk, Kurt; and Rembold, Heinz, 4,013,698.
Merz, Jurg; and Schibler, Luzius, 4,013,655.
Meyer, Hans Rudolf, 4,013,642.
Schmidt, Andreas, 4,013,619.
Weber, Kurt; and Luthi, Christian, 4,013,713.

Cicatelli, Rodolfo, to Autovox S.p.A. Cassette recording and handling device. 4,014,041, Cl. 360-96.000.

Cincinnati Milacron Inc.: *See—*
Aggarwal, Pawan Kumar, 4,013,932.

Cities Service Company: *See—*
DeJuneas, James V.; McIntyre, Gordon L.; and O'Horo, James F., Jr., 4,013,622.
Greene, Marvin, 4,013,543.

Citizen Watch Co., Ltd.: *See—*
Tokunaga, Yoshio, 4,013,281.

Clapham, Peter Brian; and Hutley, Michael Christopher, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defence in Her Britannic Majesty's Government of the. Reducing the reflectance of surfaces to radiation. 4,013,465, Cl. 96-36.000.

Claude, Pierre M. R.; Gencey, Robert E.; Mottry, Jean-Paul; and Cayre, Rene H., to Etat Francais. Illuminating projectiles and pyrotechnic devices. 4,013,009, Cl. 102-35.600.

Cleveland, John P. Paint can holder. 4,013,251, Cl. 248-210.000.

Clonts, Alpheus Eugene: *See—*
Biddle, Arthur; and Clonts, Alpheus Eugene, 4,013,479.

Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, to Sandoz Ltd. Organic compounds. 4,013,690, Cl. 260-343.30R.

Clune, James P.; Aptt, Harry W.; and Marci, Sebastian J., to North American Philips Corporation. Electrode protecting means for electric discharge lamps. 4,013,914, Cl. 313-313.000.

Cocozza, Salvatore, to I.S.F. S.p.A. Inhalers and insufflators having a cutting means. 4,013,075, Cl. 128-266.000.

Cohen, Monroe; and Dorothea, Gale, to Shoot The Hoops, Inc. Automatic basketball game having scoring indicator and time limitation. 4,013,292, Cl. 273-102.20R.

Cohen-Solal, Gerard; Zozime, Alain; and Sella, Claude, to Agence Nationale de Valorisation de la Recherche (ANVAR). Volatilization and deposition of a semi-conductor substance and a metallic doping impurity. 4,013,533, Cl. 204-192.00S.

Colebourn, Graham Martin, to Marconi Instruments Limited. A.M. Signal generator having an r.f. output level control. 4,013,961, Cl. 325-144.000.

Colecchi, Paul S.; and Kotecki, Cezary, to A. B. Dick Company. Ribbon tensioning device for ribbon cartridge. 4,013,160, Cl. 197-151.000.

Colella, Donald F.; and Kaiser, Carl, to SmithKline Corporation. Bis-phenoxypropanolamines. 4,013,777, Cl. 424-316.000.

Colgate-Palmolive Company: *See—*
Liebowitz, Marvin; and Brandli, Eugene Howard, 4,013,475.
Wixon, Harold Eugene, 4,013,577.

Combustion Engineering, Inc.: *See—*
Halloran, John Joseph, Jr., 4,013,235.

Commissariat a l'Energie Atomique: *See—*
Aubert, Michel; and Lemercier, Guy, 4,012,879.

Communications Patents Limited: *See—*
Gargini, Eric John, 4,013,963.

Computeacher Limited: *See—*
Wemekamp, Henry, 4,012,979.

Comstock, Douglas K., to Westinghouse Electric Corporation. Power operated antenna assembly. 4,014,026, Cl. 343-766.000.

Conch, Lng: *See—*
Ffooks, Roger Cambridge, 4,013,189.

Cone, John A.; Archer, Robert A.; Pacheco, Edward R.; and Peyton, Creath E., to TRW Inc. Backfire bifilar helical antenna. 4,014,028, Cl. 343-895.000.

Connor, David T.; Young, Patricia; and Von Strandtmann, Max, to Warner-Lambert Company. 2,3-Dihydro-3-(2-pyridinyl)-4H-1-benzopyran-4-one N-oxides. 4,013,673, Cl. 260-297.00B.

Conrad, Raymond M. Cassette. 4,013,890, Cl. 250-480.000.

Consiglio Nazionale delle Richerche: *See—*
Burlamacchi, Pio; Pratesi, Riccardo; and Vanni, Umberto, 4,013,978.

Continental Can Company, Inc.: *See—*
Holk, Albert J., Jr.; and Hawkins, Jerry D., 4,012,935.

Continental Gummi-Werke Aktiengesellschaft: *See—*
Moeller, Heinz J.; and Jagau, Heinz, 4,013,390.

Continental Oil Company: *See—*
Evens, David A., 4,013,423.
Stauter, John C.; and Pace, Gerald F., 4,013,754.

Contraves-Goerz Corporation: *See—*
Jones, Donald H.; and McNally, Paul F., 4,014,014.

Cooksey, Raymond: *See—*
Sellors, Roland George Ronald; and Cooksey, Raymond, 4,013,115.

Copal Company Limited: *See—*
Okabe, Katsuhiko, 4,013,159.

Copeland, Melvin; and Konazewski, William Peter, to American Cyanamid Company. Moisture dermatometer. 4,013,065, Cl. 128-2.00R.

Copyer Co., Ltd.: *See—*
Green, Mitchell V.; Akita, Yukio; and Tachikawa, Mitsuji, 4,013,285.

Corbley, Eugene K., to General Electric Company. Discharge lamp having fuse-switch guard against jacket failure. 4,013,919, Cl. 315-73.000.

Corey, Albert E.; and Donermeyer, Donald D., to Monsanto Company. Acid-modified poly(vinyl acetate) textile sizes. 4,013,805, Cl. 427-390.00R.

Corley, Boyce M.: *See—*
Blasche, Thomas L., Jr.; Kobbeman, Donald D.; and Corley, Boyce M., 4,013,743.

Cormia, Robert L.; Tsujimoto, Kazumi N.; and Andresen, Sigurd, to Airco, Inc. Method for coating a substrate. 4,013,532, Cl. 204-192.00C.

Corning Glass Works: *See—*
Rogers, Charles H.; Sullivan, Kevin J.; and Vance, Miles E., 4,013,038.

Corthell, William I., to Austin Electronics, Inc. Warning light control. 4,013,921, Cl. 315-241.00R.

Cosco, Inc.: *See—*
Lay, Ralph B.; and Moore, Donald L., 4,013,372.

Cosden Technology, Inc.: *See—*
Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., 4,013,604.

Cotter, Robert F.: *See—*
Weisman, Sidney; and Cotter, Robert F., 4,012,796.

Coulter Information Systems, Inc.: *See—*
Kuehnle, Manfred R., 4,013,539.

Covington, Morris T.; and Griffin, Steven M., to Shafer Valve Company. Electronic fluid pipeline leak detector and method. 4,012,944, Cl. 73-40.50R.

Cowan, John Richard: *See—*
Bornmann, Robert Edward; Cowan, John Richard; and Schneider, Mark Joel, 4,013,879.

CPC International Inc.: *See—*
Nelson, Arthur L.; Skrabacz, Donald J.; and Young, Burbank, 4,013,775.

Crabtree, Norman, to Girling Limited. Mechanically and hydraulically operated brake actuator. 4,013,150, Cl. 188-326.000.

Craig, Glenn D.; Feuling, David T.; and LeHaye, Paul G., to Aqua-Chem, Inc. Reduction of gaseous pollutants in combustion flue gas. 4,013,399, Cl. 431-351.000.

Craine, Richard W.: *See—*
Parker, Ernest G.; Lucanera, Constantino; and Craine, Richard W., 4,014,024.

Cramp, Harry Donald: *See—*
Williams, Philip David Lane; and Cramp, Harry Donald, 4,014,018.

Crane, John Reed, to Sperry Rand Corporation. Method for non-destructive removal of semiconductor devices. 4,012,832, Cl. 29-575.000.

Crawford, Lynn D., to Hanscom, Genevieve I.; and Genevieve I. Hanscom, Robert M. Magnuson and Lois J. Thomson, Trustees of the Estate of Roy M. Magnuson, part interest to each. Apparatus for forming trays. 4,012,999, Cl. 93-51.100.

Crawford, Lynn D.: *See—*
Daugherty, Ralph K.; and Crawford, Lynn D., 4,012,998.

Crawford, Thomas A., to Midwest Precision Corporation. Sealed caster. 4,013,808, Cl. 427-289.000.

Crayton, William James, to Buchanan, Thomas, a part interest. Exhaust apparatus. 4,012,907, Cl. 60-315.000.

Crenshaw, Ronnie Ray; Luke, George Michael; and Siminoff, Paul, to Bristol-Myers Company. Antiviral, substituted 1,3-dimethyl-1H-pyrazolo(3,4b)quinolines. 4,013,665, Cl. 260-288.0CF.

Crisp, Harold Alfred: *See—*
Johnson, Martin Godfrey; Turnbull, John Peter; and Crisp, Harold Alfred, 4,013,680.

Cropper, Winifred. Mechanical stool for handicapped persons. 4,013,316, Cl. 297-347.000.

Cullen, Walter P.: *See—*
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 4,013,789.

Culver, Richard B., to Dresser Industries, Inc. Address decoder for use with multichannel analyzers. 4,013,874, Cl. 235-92.0PC.

Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., to Krause Milling Company. Art of catalyzing the reaction between a polyol and a polyaldehyde. 4,013,629, Cl. 260-123.700.

Cunningham, James Robert. Dispensing device. 4,013,073, Cl. 128-216.000.

Curran, Adrian Charles Ward: *See—*
Wilson, Edward McKenzie; and Curran, Adrian Charles Ward, 4,013,645.

Currie, John, to Photo-Me Limited. Photographic apparatus. 4,014,032, Cl. 354-93.000.

Custom Fabricators, Inc.: *See—*
Bourgeois, Ronald D., 4,013,167.
Cutler-Hammer, Inc.: *See—*
Graham, Robert O.; and Rauenbuehler, John A., 4,013,985.
Grebner, Stuart W.; Johnson, James V.; and Josemans, Leonardus J., 4,013,858.
Cutler, Ivan B.: *See—*
Jatkar, Arun D.; Cutler, Ivan B.; Virkar, Anil V.; and Gordon, Ronald S., 4,013,477.
Cyprus Metallurgical Processes Corporation: *See—*
Goens, Duane N.; and Kruesi, Paul R., 4,013,457.
Daghetti, Giuseppe: *See—*
Rosa, Giovanni; Morelli, Claudio; Brando, Pasquale; and Daghetti, Giuseppe, 4,012,919.
Dahl, Warren F., to Standard Pressed Steel Co. Method of fastener assembly for preloading a joint. 4,012,828, Cl. 29-517.000.
Dahm, Manfred: *See—*
Wagner, Kuno; and Dahm, Manfred, 4,013,625.
Dailey, Charles L.: *See—*
Behrens, Hermann W.; Grohs, Gerhard L.; and Dailey, Charles L., 4,013,977.
Daimler-Benz Aktiengesellschaft: *See—*
Andres, Rudolf; and Moller, Hermann, 4,013,883.
Behnke, Horst, 4,013,334.
Reidelbach, Willi; Grach, Herbert; Lutze, Hans; and Weidemann, Dieter, 4,013,317.
Sommer, Helmut, 4,013,055.
D'Amico, John J., to Monsanto Company. Azabicyclononanecarbodithioic acid. 4,013,638, Cl. 260-239.0BA.
Dana Corporation: *See—*
Guenther, William D., 4,013,057.
Danguillier, Wilhelm: *See—*
Gernhardt, Paul; Pohl, Siegfried; Danguillier, Wilhelm; and Grams, Wolfgang, 4,013,427.
Danyliw, George Jack, to International Nickel Company, Inc., The. Method of, and mixer for intimate blending of fine, dry, particulate solid materials with moist wet or slurried particulate solid materials. 4,013,273, Cl. 259-8.000.
Darling, Myron E., to BJD Industries, Inc. Locking thread. 4,013,110, Cl. 151-14.00R.
Darsie, Burns: *See—*
Kulczycki, Karol; and Darsie, Burns, 4,013,103.
Data General Corporation: *See—*
Sorensen, Karsten; Bernstein, David H.; and Druke, Michael B., 4,014,006.
Datotek, Inc.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,013,837.
Dauenbaugh, Robert L., to Keystone Consolidated Industries. Cylinder retention mechanism. 4,012,928, Cl. 70-81.000.
Daugherty, Ralph K.; and Crawford, Lynn D., to Hanscom, Genevieve I.; and Genevieve I. Hanscom, Robert M. Magnuson & Lois J. Thomson, Trustees of the Estate of Roy M. Magnuson, part interest to each. Carton sealing method and apparatus. 4,012,998, Cl. 93-39.00R.
Dauser, William C., Jr., to Heneveld, Lloyd A., trustee. Electrical connector. 4,013,332, Cl. 339-98.000.
Davies, James Francis: *See—*
Child, Terence Frederick; and Davies, James Francis, 4,013,578.
Davies, John C.: *See—*
Boham, Ambrose C.; Davies, John C.; and Kendall-Smith, Brian J., 4,013,276.
Davis, Dale M., to United States of America, Air Force. Ordnance fuze time delay mechanism. 4,013,013, Cl. 102-72.000.
Davis, J. C. Extension spray gun. 4,013,225, Cl. 239-195.000.
Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., to Gulf Research & Development Company. Fibrils and processes for the manufacture thereof. 4,013,751, Cl. 264-140.000.
Davis, Ralph A.: *See—*
Pews, R. Garth; and Davis, Ralph A., 4,013,683.
Davis, Robert F., to Walter Kidde & Company, Inc. Modular fire protection system. 4,013,128, Cl. 169-61.000.
Davis, William R., to Nalco Chemical Company. Process for reducing BOD in food processing plant wastes. 4,013,555, Cl. 210-51.000.
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, to Felten & Guilleaume Kabelwerke AG. Reinforced article and method of making the same. 4,012,824, Cl. 29-419.00R.
Dawson, Daniel J.; Otteson, Kenneth M.; and Seitz, C. Thomas, to Dynapol Corporation. Edibles sweetened with flavanones. 4,013,801, Cl. 426-548.000.
Dayco Corporation: *See—*
Ballou, David G.; Bishop, Clinton L.; and Pope, Toby K., 4,012,962.
Logan, Arthur D.; and Rush, James B., 4,013,101.
De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See—*
Reinders, Michiel Antonius, 4,014,027.
Debar, Francis: *See—*
Roger, Bernard; Ayel, Michel; and Debar, Francis, 4,013,337.
Decca Limited: *See—*
Williams, Philip David Lane; and Cramp, Harry Donald, 4,014,018.
Deem, Brian C.; Pataky, Gilbert A.; and Thompson, George W., to Bendix Corporation, The. Speed sensor assembly. 4,013,954, Cl. 324-173.000.
Deere & Company: *See—*
Soteropulos, Gust; and Meiers, Gerald Franklyn, 4,012,892.
Steuerwald, Wilfred LeeRoy, 4,012,891.
Defago, Raymond: *See—*
Liechti, Hans Wilhelm; and Defago, Raymond, 4,013,408.
de Feudis, Sergio, to Aktiebolaget Svenska Flaktfabriken. Device for sorting of goods. 4,013,551, Cl. 209-73.000.
de Fligue, Wladimir; and Mottet, Claude Henri. Voltmetric system comprising an electromagnetic relay. 4,013,931, Cl. 361-187.000.
DeFrees, Joseph H. Loading and unloading valve mechanism for transportation tank. 4,013,096, Cl. 137-612.100.
DeJuneas, James V.; McIntyre, Gordon L.; and O'Horo, James F., Jr., to Cities Service Company. Method of reducing breakdown in polyethylene film. 4,013,622, Cl. 260-45.95S.
Delalande S.A.: *See—*
Fauran, Claude P.; Eberle, Jeannine A.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,013,768.
de Lanauze, Jacques. Die cutting rule. 4,012,978, Cl. 83-669.000.
Delfosse, Pierre; and Bosshard, Alfred, to Pluss-Staufer AG. Ultrafine natural calcium carbonates as fillers in varnishes and paints. 4,013,602, Cl. 260-22.00R.
Deli, Joseph; and Stevens, Henry C., to PPG Industries, Inc. N-(3-methyl-5-isothiazolyl)-2-methylpentanamide. 4,013,675, Cl. 260-306.80A.
DeLorean, John Z.; and Dirks, Chauncey L., to John Z. DeLorean Corporation. Composite tubing. 4,013,102, Cl. 138-144.000.
DeMarinis, Robert M., to SmithKline Corporation. Compositions and methods for treating bacterial infections with substituted acetamidocephalosporins. 4,013,765, Cl. 424-246.000.
Demetre, S. Gordon, to Eastern Graphic Products, Inc. Decurler device. 4,013,284, Cl. 271-183.000.
Deminet, Czeslaw. Method of diffusion bonding. 4,013,210, Cl. 228-106.000.
Deming, Andrew F., to Alliance Manufacturing Company, Inc., The. Electric motor, stator and lamination therefor. 4,013,910, Cl. 310-211.000.
den Hollander, Willem, to RCA Corporation. High voltage regulation system. 4,013,923, Cl. 315-411.000.
Dennison, Charles M., to Rockwell International Corporation. Programmable digital phase control apparatus. 4,013,969, Cl. 328-155.000.
Denz, Jerome T.: *See—*
Weady, Andrew A.; and Denz, Jerome T., 4,013,166.
Denzinger, Walter; Hofmann, Ernst; and Herrle, Karl, to BASF Aktiengesellschaft. Manufacture of insoluble and only slightly water-swellable polymers of N-vinyl lactams of improved adsorptivity. 4,013,825, Cl. 526-208.000.
de Putter, Jan A.; and Kortenoeven, Johannes, to Oce-van der Grinten N.V. Panchromatically sensitive zinc oxide. 4,013,783, Cl. 423-622.000.
Deuber, John Martin: *See—*
Stevens, Peter; Deuber, John Martin; and Rosikiewicz, Kathleen Regina, 4,013,523.
Deutsche Babcock & Wilcox Aktiengesellschaft: *See—*
Piontek, Gunter; Firlay, Heinz; and Westheider, Heinz, 4,013,180.
Deutsche Gesellschaft fur Schadlingbekampfung mbH: *See—*
Kapp, Wolfgang, 4,013,790.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Hering, Gunter; and Engels, Werner, 4,013,274.
Devine, John A., to Bendix Corporation, The. Bellows caging mechanism for airborne hydrophone. 4,013,990, Cl. 340-3.00T.
Devtron Corporation: *See—*
Gundlach, Philip M., 4,014,015.
Dewberry, Larry F.; Banks, Robert H.; and Dildy, Clell A., to United States of America, Navy. Diver's piezoelectric microphone with integral AGC preamplifier. 4,013,992, Cl. 340-10.000.
DeWeese, Raymond Paul, to Roper Corporation. Latch mechanism for self-cleaning oven. 4,013,312, Cl. 292-113.000.
Deyo, Charles R.: *See—*
Journot, Vida M.; Deyo, Charles R.; and Hunnicutt, Jack B., 4,012,852.
Di-Acro Division, Houdaille Industries, Inc.: *See—*
Kaufmann, Harold; and Sprick, Kenneth, 4,013,282.
Diament, Elza Samuilovna; Kiselev, Sergei Viktorovich; Monin, Vladimir Leonidovich; Petrusinsky, Vyacheslav Vyacheslavovich; and Pronin, Vladimir Mikhailovich. Audio-visual teaching machine for speedy training and an instruction center on the basis thereof. 4,012,848, Cl. 35-8.00A.
Dickman, James J. Leg exercise and foot rest for automotive vehicles. 4,013,287, Cl. 272-136.000.
Diemolding Corporation: *See—*
Puderbaugh, George; Myers, Thomas S.; Pike, Robert W.; and Atley, Robert B., 4,013,076.
Dietz, Robert E.; Ophaug, Darrell P.; and Steve, Lynn B , to Square D Company. Multiple duty components of a ground fault receptacle. 4,013,929, Cl. 361-357.000.
Diggs, Richard E. Wave power apparatus supported and operated by floats in water. 4,013,382, Cl. 417-332.000.
Dildy, Clell A.: *See—*
Dewberry, Larry F.; Banks, Robert H.; and Dildy, Clell A., 4,013,992.
Dilgard, Michael H.; and Meir, James W. Manifold apparatus for multi-cylinder motorcycle engines. 4,013,049, Cl. 123-52.00M.
Dillon, Paul J.: *See—*
Hutchinson, Ronald G.; and Dillon, Paul J., 4,012,802.
Dinkelkamp, Henry T.; Carus, Bryce W.; and Norman, Robert J., to

Stewart-Warner Corporation. Fuel pump. 4,013,053, Cl. 123-136.000.
Director-General of the Agency of Industrial Science and Technology: *See—*
Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, 4,013,585.
Dirks, Chauncey L.: *See—*
DeLorean, John Z.; and Dirks, Chauncey L., 4,013,102.
Display Pack, Inc.: *See—*
Hansen, Roger P.; and Vis, Larry J., 4,013,214.
Dr. C. Otto & Comp. G.m.b.H.: *See—*
Gernhardt, Paul; Pohl, Siegfried; Danguillier, Wilhelm; and Grams, Wolfgang, 4,013,427.
Haese, Egon, 4,013,779.
Dr. Carl Hahn GmbH: *See—*
Warncke, Niels; and Johst, Wolfgang, 4,012,809.
Dr. -Ing. Rudolf Hell GmbH: *See—*
Baar, Walter; and Dolves, Jurgen, 4,013,829.
Dolves, Jurgen; and Grieger, Dieter, 4,013,831.
Doerner, Frank. Chair control for tiltable chairs. 4,013,258, Cl. 248-381.000.
Dohi, Takashi; Ohara, Kenichi; and Gotoh, Iwao, to Matsushita Electric Industrial Co., Ltd. Needle position detector for industrial type sewing machines. 4,013,933, Cl. 318-467.000.
Dolan, Thomas J.; and Mitchell, Robert S., to Monsanto Company. Vanadium catalysts prepared with phosphonates. 4,013,586, Cl. 252-437.000.
Dolves, Jurgen; and Grieger, Dieter, to Dr. -Ing. Rudolf Hell GmbH. Method for the production of printing forms. 4,013,831, Cl. 358-299.000.
Dolves, Jurgen: *See—*
Baar, Walter; and Dolves, Jurgen, 4,013,829.
Doncasters Moorside Limited: *See—*
Stansfield, Fred, 4,012,826.
Donenfeld, Henry, to Printon Australasia Pty. Limited. Aqueous printing pastes for producing transfer printing papers by rotary screen printing. 4,013,405, Cl. 8-2.50A.
Donermeyer, Donald D.: *See—*
Corey, Albert E.; and Donermeyer, Donald D., 4,013,805.
Dorfman, Edwin; Schwartz, Willis T., Jr.; and Hindersinn, Raymond R., to Hooker Chemicals & Plastics Corporation. Fire retardant unsaturated polyesters. 4,013,815, Cl. 428-285.000.
Dornaus, Johannes; Lahmer, Jurgen; and Refflinghaus, Bernd, to U.S. Philips Corporation. Telecommunication system with automatically switched modems. 4,013,956, Cl. 325-22.000.
Dornbluth, Jurgen R. K.; Engel, Gerd; and Klassen, Heinrich, to Scharmann & Co. Boring mill and milling device with a tool magazine. 4,012,818, Cl. 29-26.00A.
Dornier System GmbH: *See—*
Hutterer, Karl, 4,013,170.
Dorothea, Gale: *See—*
Cohen, Monroe; and Dorothea, Gale, 4,013,292.
Dorre, Erhard; Semlitsch, Manfred; and Frey, Otto, to Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung. Artificial head assembly for an articulated joint between two bones. 4,012,795, Cl. 3-1.910.
Dory, Jacques, to Realization Ultrasoniques. Ultrasonic system. 4,012,952, Cl. 73-67.700.
Douglas, Graham M., to McDonnell Douglas Corporation. Solid state image modulator. 4,013,832, Cl. 358-212.000.
Douglas, James L.: *See—*
Horning, Donald E.; Morris, Leeson R.; and Douglas, James L., 4,013,648.
Doviak, Peter L.: *See—*
Kalwaites, Frank; and Doviak, Peter L., 4,013,752.
Dow Chemical Company, The: *See—*
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.
Ozretich, Thomas M., 4,013,772.
Pews, R. Garth; and Davis, Ralph A., 4,013,683.
Dowd, Allyn C.; and Rogowski, John D., to Massey-Ferguson Inc. Dual position stabilizer. 4,013,307, Cl. 280-764.000.
Draper Products, Inc.: *See—*
Sabee, Reinhardt N.; and Sabee, C. Craig, 4,013,816.
Dresser Industries, Inc.: *See—*
Culver, Richard B., 4,013,874.
Driscoll, John N.; and Spaziani, Frederick F., to HNU Systems Inc. Ion detection electrode arrangement. 4,013,913, Cl. 313-242.000.
Druke, Michael B.: *See—*
Sorensen, Karsten; Bernstein, David H.; and Druke, Michael B., 4,014,006.
Drury, David Michael: *See—*
Tice, Lee Don; and Drury, David Michael, 4,013,925.
DSO "Cherna Metalurgia": *See—*
Georgiev, Assen Yordanov; and Genev, Ivan Vassilev, 4,013,401.
Dubois, Eugene. Artificial fishing lure and spinner. 4,012,862, Cl. 43-42.060.
DuBois, Robert Clark; Lavin, Eugene Patrick; and Miciukiewicz, Joseph F., to Pitney-Bowes, Inc. Electrostatic copier including means for detaching paper from a photoconductor. 4,013,359, Cl. 355-16.000.
Dufft, William Henry, to Bell Telephone Laboratories, Incorporated. Light emitting device mounting arrangement. 4,013,915, Cl. 313-499.000.
Duncan, Farris N.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,013,168.
Dundore, Marvin W., to Twin Disc, Incorporated. Torque converter having adjustably movable stator vane sections. 4,012,908, Cl. 60-354.000.
Du Pont de Nemours, E. I., and Company: *See—*
Bogdanowicz, Mitchell Joseph, Jr., 4,013,649.
Froehlich, Helmut Hermann; and Lautenberger, William Jacob, 4,013,594.
Hoeschele, Guenther Kurt, 4,013,624.
Martin, Elmore Louis, 4,013,704.
Stryker, Harvey Irvin, 4,013,634.
Temple, Stanley, 4,013,627.
Wallick, Charles W., 4,012,835.
Durant, Graham John; Ganellin, Charon Robin; and Parsons, Michael Edward, to Smith Kline & French Laboratories Limited. Certain N,N'-disubstituted guanidine compounds and their use. 4,013,659, Cl. 424-263.000.
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, to Smith Kline & French Laboratories Limited. Pyridyl-alkylaminoethylene compounds. 4,013,769, Cl. 424-263.000.
Durant, Graham John: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,013,678.
Duvall, Dale R.: *See—*
Erwin, Jerry D.; Duvall, Dale R.; and Habitzreiter, Richard K., 4,013,999.
Dvali, Rafael Rafaelovich; Margvelashvili, Otar Vladimirovich; Nozadze, Alexei Dmitrievich; Burdzgla, Mikhail Erastovich; and Melitauri, Alexandr Nikolaevich. Optical device for a surface vehicle guidance system using a light-contrast programme. 4,013,884, Cl. 250-202.000.
Dvorov, Jury Ivanovich; and Orlov, Vladislav Evgenievich. Shaping-and-cutting broach. 4,012,829, Cl. 29-567.000.
Dwyer, Sean G.; and Hackbarth, Daryl J., to S. C. Johnson & Son, Inc. Self-stripping coating composition. 4,013,607, Cl. 260-29.60H.
Dye, John F., to Kendall Company, The. Tubing connector. 4,013,310, Cl. 285-110.000.
Dykstra, Philip R.: *See—*
Schneiter, Fred E.; Dykstra, Philip R.; and Kennedy, Carver G., 4,013,010.
Dynamit Nobel Aktiengesellschaft: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Morgenstern, Dieter, 4,013,656.
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.
Dynapol Corporation: *See—*
Dawson, Daniel J.; Otteson, Kenneth M.; and Seitz, C. Thomas, 4,013,801.
E-C Apparatus Corporation: *See—*
Lederer, William H., 4,013,513.
E.M.V. Elektro-Mechanische Versuchsanstalt: *See—*
Kornhaas, Wolfgang, 4,014,040.
E. R. Squibb & Sons, Inc.: *See—*
Hoehn, Hans, 4,013,672.
Eachus, Joseph J.; Graff, Theodore S.; and Seggelin, Douglas H., to Honeywell Information Systems, Inc. Data entry system. 4,013,835, Cl. 178-18.000.
Eastern Graphic Products, Inc.: *See—*
Demetre, S. Gordon, 4,013,284.
Eastham, John Frederick, to National Research Development Corporation. Electromagnetic levitation. 4,013,906, Cl. 310-13.000.
Eastman Kodak Company: *See—*
Armstrong, Timothy G.; Kroll, Arthur S.; and Shuster, Frank A., 4,013,041.
Babbitt, John M.; and Houle, James F., 4,013,696.
Haase, Jan R.; Eldredge, Carl H.; and Landholm, Richard A., 4,013,633.
Landholm, Richard A.; Haase, Jan R.; and Krutak, James J., Sr., 4,013,635.
Landon, John T., Jr., 4,013,470.
Light, William A., 4,013,464.
Eaton Corporation: *See—*
Brown, Richard J., 4,013,154.
Eberle, Jeannine A.: *See—*
Fauran, Claude P.; Eberle, Jeannine A.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,013,768.
Eberly, Paul E., Jr., to Exxon Research and Engineering Company. Water injection in a hydrodesulfurization process. 4,013,637, Cl. 208-216.000.
Ebisawa, Mitsuo: *See—*
Haga, Teruhide; Horigome, Koichi; and Ebisawa, Mitsuo, 4,013,469.
Eccher, Joseph A.: *See—*
Sherritt, Jay G.; and Eccher, Joseph A., 4,014,016.
Echigoya, Mitsuru: *See—*
Nagoshi, Fumiya; Arakawa, Hideyuki; Uchino, Hayashi; Echigoya, Mitsuru; and Matsuo, Masaki, 4,013,608.
Ecquacon Corporation: *See—*
Kreuter, Jacob, 4,013,552.
Eder, Anton. Pressure balancing device for heating systems. 4,013,221, Cl. 237-8.00R.

Edmonston, William H., to Lectron Products, Inc. Carburetor. 4,013,741, Cl. 261-44.00R.

Edwards, Theodore B.: *See—*
Hunt, Robert G.; and Edwards, Theodore B., 4,012,989.

Eggers, Warren J., to IMC Chemical Group, Inc. 5-Hydroxymethyl-1-aza-3,7-dioxabicyclo[3.3.0]-octane as a setting agent for permanent waving. 4,013,409, Cl. 8-127.510.

Eggimann, Donald: *See—*
Betzer, Peter R.; and Eggimann, Donald, 4,013,419.

Eguchi, Sadanari: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, 4,013,800.

Egyesult Izzolampa Es. Villamossagi Resveny tarsasag: *See—*
Gaal, Otto, 4,013,163.
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.

Ehlert, Thomas C.: *See—*
Trumble, John H.; Ehlert, Thomas C.; and Szekely, Akos, 4,013,061.

Eichman, Martin L.; and Belsole, Susan C., to Warner-Lambert Company. Process for the production of base for topical steroids. 4,013,792, Cl. 424-181.000.

Einberg, Fred J., to United States of America, Army. Adhesive tetrazole polymers and process of making therefor. 4,013,596, Cl. 260-2.00R.

Eisele, Gottfried: *See—*
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.

Eisenhauer, William A. Universal planisphere complete guidance and computer system. 4,012,851, Cl. 35-44.000.

Elbert, Raymond John, to Union Carbide Corporation. High void porous sheet and process therefor. 4,013,461, Cl. 75-212.000.

Eldec Corporation: *See—*
Chiles, William E.; Vetsch, LeRoy E.; and Peterson, Jack V., 4,012,957.

Eldredge, Carl H.: *See—*
Haase, Jan R.; Eldredge, Carl H.; and Landholm, Richard A., 4,013,633.

Eli Lilly and Company: *See—*
Abdulla, Riaz F., 4,013,658.
Lacefield, William B., 4,013,654.
Spitzer, Wayne Alfred, 4,013,651.

Ellingson, Robert T., to Astro Plastics, Inc. Unitary wall member guard. 4,012,878, Cl. 52-288.000.

Emelyanov, Jury Mikhailovich; and Emelyanov, Mikhail Fedorovich. High-frequency tubular ozonizer. 4,013,567, Cl. 250-540.000.

Emelyanov, Mikhail Fedorovich: *See—*
Emelyanov, Jury Mikhailovich; and Emelyanov, Mikhail Fedorovich, 4,013,567.

Emhart Industries, Inc.: *See—*
Solovieff, Paul G., 4,012,929.
Willitts, Benjamin R.; and Klossman, Charles W., 4,012,921.

Emmett, John Colin: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,013,678.
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,013,769.

Emsley, Alan Brian, to Imperial Chemical Industries Limited. Electrolytic cells. 4,013,525, Cl. 204-98.000.

Enad, Estela G.: *See—*
Smalligan, Wayne J.; Kelly, Vincent J.; and Enad, Estela G., 4,013,799.

Endo Laboratories, Inc.: *See—*
Rajagopalan, Parthasarathi, 4,013,652.

Engel, Gerd: *See—*
Dornbluth, Jurgen R. K.; Engel, Gerd; and Klassen, Heinrich, 4,012,818.

Engel, Stephen August, to Union Carbide Corporation. Spot scarfing nozzle for use in gang arrangement. 4,013,486, Cl. 148-9.500.

Engels, Werner: *See—*
Hering, Gunter; and Engels, Werner, 4,013,274.

Engelskirchen, Konrad; and Galinke, Joachim, to Henkel & Cie G.m.b.H. Process for preparation of mixed cellulose ethers containing 2,3-dihydroxypropyl ether groups. 4,013,821, Cl. 536-88.000.

Enghag, Per: *See—*
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,487.
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,488.

Engineering & Research Associates, Inc.: *See—*
Hosterman, Craig; Michel, William E.; and Oldham, Dale R., 4,013,860.

Engler, Elliott E. Thermometer carrying case and illuminating device. 4,013,882, Cl. 240-6.460.

Engler, Peter: *See—*
Kuerten, Heribert; Nagel, Otto; Sinn, Richard; Weinle, Werner; and Engler, Peter, 4,013,744.

Enright, Wayne Jay, to Bunker Ramo Corporation. Setting means for estimated time of arrival clock hands. 4,012,900, Cl. 58-126.00D.

Enters, Edward W.; and Itle, Mark J., to Gilson Bros. Co. Clutch mechanism for rotary tillers and the like. 4,012,963, Cl. 74-242.15R.

Environment/One Corporation: *See—*
Peters, Philip H., Jr., 4,013,859.
Skala, George Frank, 4,013,953.

Envirotech Corporation: *See—*
Lombana, Luis A.; and Campos, Jose G., 4,013,023.

ErkenBrack, Kenneth B., to New Products, Inc. Curved pin and inserter. 4,013,207, Cl. 227-120.000.

Erwin, Jerry D.; Duvall, Dale R.; and Habitzreiter, Richard K., to Recognition Equipment Incorporated. Single read station acquisition for character recognition. 4,013,999, Cl. 340-146.30H.

Eskeli, Michael. Turbine. 4,012,912, Cl. 60-682.000.

Etat Francais: *See—*
Claude, Pierre M. R.; Gencey, Robert E.; Mottry, Jean-Paul; and Cayre, Rene H., 4,013,009.
Tellie, Paul E., 4,012,844.

Ethyl Corporation: *See—*
Brackenridge, David R., 4,013,728.
Seth, Kishan K., 4,013,780.

Eutectic Corporation: *See—*
Patel, Mahesh S., 4,013,453.

Evans, Robert M.; and Fogel, Joseph S. Composition and method for making seamless flooring and the like. 4,013,598, Cl. 260-13.000.

Evans, Thomas W., to UOP Inc. Combination flow distribution and collection apparatus. 4,013,556, Cl. 210-136.000.

Evens, David A., to Continental Oil Company. Fluid cat cracker apparatus. 4,013,423, Cl. 23-288.00S.

Ewald, Ronald F., to Seaquist Valve Company, Div. of Pittway Corporation. Double seal valve stem. 4,013,197, Cl. 222-402.240.

Ewertowski, Norbert, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Tool changer for horizontal drilling-milling machines. 4,012,830, Cl. 29-568.000.

Ewing, Joan R.: *See—*
Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., 4,013,462.

Exxon Nuclear Company, Inc.: *See—*
Breneman, Richard; and Parry, Dwight L., 4,013,905.

Exxon Research and Engineering Company: *See—*
Bushnell, James D., 4,013,549.
Eberly, Paul E., Jr., 4,013,637.
Gudelis, David A.; and Shaw, David H., 4,013,542.
Kawar, Faisal T., 4,013,442.
Kim, Chang J., 4,013,734.
Woo, Charles, 4,013,736.

Ezoe, Mitsuhiko; and Ozawa, Hiroshige, to Nissan Motor Co., Ltd. Circuit testing apparatus. 4,013,951, Cl. 324-73.00R.

Fabre, Brian K.; and Vander Laan, John S., III. Extender for increasing the travel of motorcycle shock absorbers. 4,013,149, Cl. 188-281.000.

Fabre-Curtat, Michel; and Thiery, Jean, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Gripping shoe equipping a device for pulling an elongate member. 4,013,205, Cl. 226-173.000.

Fabrique Nationale Herstal S.A.: *See—*
Gabriels, Andre, 4,013,011.

Faix, Louis J.: *See—*
Balsley, Richard L.; and Faix, Louis J., 4,013,054.

Falensky, Georg, to Grunzweig & Hartmann und Glasfaser AG. Air cooling equipment for cooling containers. 4,012,922, Cl. 62-240.000.

Falls, Robert A., to United States of America, Army. Apparatus for measuring the electromagnetic impedance of soils. 4,013,950, Cl. 324-58.50R.

Farbenfabriken Bayer Aktiengesellschaft: *See—*
Frommer, Werner; Puls, Walter; Schafer, Dietmar; and Schmidt, Delf, 4,013,510.

Farhadieh, Bahram; and Berdahl, James Maynard, to Abbott Laboratories. Universally useable tableting ingredients. 4,013,820, Cl. 536-64.000.

Fassbind, Frank A., to United States of America, Navy. Mid-pulse detector. 4,013,967, Cl. 329-104.000.

Fattore, Vittorio: *See—*
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, 4,013,589.
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, 4,013,590.

Fauran, Claude P.; Eberle, Jeannine A.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., to Delalande S.A. Pyrimidin-6-yl acethydroxamic acids, their therapeutic application and their process of preparation. 4,013,768, Cl. 424-251.000.

Fay, Rudolph J., to J. W. Fay & Son, Inc. Dough mixer. 4,013,234, Cl. 241-101.600.

Fear, James R., to Allis-Chalmers Corporation. Battery mount. 4,013,136, Cl. 180-68.500.

Feaster, Donavon L., to Mount Hope Machinery Company, Incorporated. Roll section and manufacture of sleeved roller therewith. 4,012,821, Cl. 29-116.00R.

Feath, William M.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,013,837.

Fechtig, Bruno, to Ciba-Geigy Corporation. Process for the manufacture of 3-methylene-cepham compounds. 4,013,650, Cl. 260-243.00C.

Feichtinger, Hans; Birnkraut, Hans-Walter; Lutze, Siegfried; Payer, Wolfgang; and Schnier, Dieter, to Ruhrchemie Aktiengesellschaft. Chromium-containing catalyst systems and their use for the polymerization of olefins. 4,013,822, Cl. 526-129.000.

Feild, James R. Intervertebral protector means. 4,013,078, Cl. 128-303.00R.

Feldmuhle Anlagen- und Produktionsgesellschaft mit beschrankter Haftung: *See—*
Dorre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,012,795.

Felten & Guilleaume Kabelwerke AG: *See—*
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.

Ferrin, Albert William; and Callos, John G., to A. W. Ferrin, Beatrice Ferrin, Donald H. Stephen, Trustees of the Lectrojog Company, Trust U/A dated 1/1/74. Card selector. 4,013,171, Cl. 209-80.500.

Ferrini, Pier Giorgio: *See—*
Haas, Georges; Ferrini, Pier Giorgio; and Rossi, Alberto, 4,013,708.

Ferris, DeLacy F., to Rockwell International Corporation. Expulsion bladder. 4,013,195, Cl. 222-95.000.

Fertilizers & Chemicals Ltd.: *See—*
Beresky, Aharon; and Bar-Akiva, Avigdor, 4,013,446.

Fetter, Richard W., to United States of America, Navy. Real time analog doppler processor for weather radar. 4,014,019, Cl. 343-5.00W.

Feuling, David T.: *See—*
Craig, Glenn D.; Feuling, David T.; and LeHaye, Paul G., 4,013,399.

Fey, Maurice G., to Westinghouse Electric Corporation. Polyphase arc heater system. 4,013,867, Cl. 219-121.00P.

Ffooks, Roger Cambridge, to Conch, Lng. Insulation system for liquified gas tanks. 4,013,189, Cl. 220-9.0LG.

Fiber Industries, Inc.: *See—*
Fischbach, Melvyn Robert, 4,012,896.

Fiebig, August Emil, Jr.: *See—*
Cella, John A.; Fiebig, August Emil, Jr.; and Pum, Franz J., 4,013,786.

Fields, Irvin L. Toy airplane of foldable sheet material and launching means for and method of making same. 4,012,865, Cl. 46-79.000.

Finger, Richard H., to Klykon, Inc. Blower and duct arrangement for air filtering system. 4,013,432, Cl. 55-467.000.

Finke, Manfred; and Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Process for the manufacture of 2-halo-ethane-phosphonic acid dihalides and vinyl-phosphonic acid dihalides. 4,013,715, Cl. 260-543.00P.

Finsterwalder, Kurt; and Riedisser, Gunter, to L. Schuler GmbH. Press with toggle joint drive mechanisms. 4,013,003, Cl. 100-285.000.

Firlay, Heinz: *See—*
Piontek, Gunter; Firlay, Heinz; and Westheider, Heinz, 4,013,180.

Fischbach, Melvyn Robert, to Fiber Industries, Inc. Yarn false twister. 4,012,896, Cl. 57-77.400.

Fischer, Hermann; Schindler, Hubert; Kuhrt, Winfried; and Weidenbach, Guenter, to Kali-Chemie Aktiengesellschaft. Process for the manufacture of spherical alumina-containing particles. 4,013,587, Cl. 252-448.000.

Fischer, Paul W.; Jones, Jerry C., deceased (Jones, Shirley J., executrix); Pyle, Delbert E.; and Pye, Stephen, to Union Oil Company of California. Composition and method for drilling formations containing geothermal fluid. 4,013,568, Cl. 252-8.50C.

Fishel, Norman A., to Monsanto Company. Ceria catalyzea conversion of phenols to dibenzofurans. 4,013,694, Cl. 260-346.20M.

Fisons Limited: *See—*
Parsons, John Henry, 4,013,669.

Fite, Wade L. Methods and apparatus for spatial separation of ac and dc electric fields with application to fringe fields in quadrupole mass filters. 4,013,887, Cl. 250-282.000.

Floreen, Stephen, to International Nickel Company, Inc., The. Cast maraging steel. 4,013,458, Cl. 75-124.000.

Florent, Jean; Lunel, Jean; and Renaut, Jacques, to Rhone-Poulenc S.A. Process for the preparation of the antibiotic 20.798 R.P. 4,013,515, Cl. 195-80.00R.

Floyd, Roger M.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,013,168.

Fluck, Rene, to S I G Schweizerische Industrie-Gesellschaft. Apparatus for grouping cookies prior to packaging. 4,013,179, Cl. 214-8.50K.

Flucke, Winfried: *See—*
Wollweber, Hartmund; and Flucke, Winfried, 4,013,676.

Fluidfire Development Limited: *See—*
Virr, Michael John, 4,013,279.

Flynn, Harold M. Self-inking hand stamp. 4,013,007, Cl. 101-333.000.

FMC Corporation: *See—*
Berkowitz, Sidney; and Juelke, Charles V., 4,013,757.
Castrantas, Harry Marcus; and Gresham, John T., 4,013,575.

Fogel, Joseph S.: *See—*
Evans, Robert M.; and Fogel, Joseph S., 4,013,598.

Foik, Adolf: *See—*
Jutte, Hans; Foik, Adolf; Babendererde, Siegmund H. F. L. M.; and Bokemeyer, Reinhard E. J., 4,012,916.

Fondronnier, Jacques: *See—*
Guillerm, Jean; and Fondronnier, Jacques, 4,013,108.

Fong, William: *See—*
Broadway, Alexander Richard William; Fong, William; and Rawcliffe, Gordon Hindle, 4,013,909.

Foote, Francis C.; and Beck, Charles K., to Addressograph Multigraph Corporation. Secure property document and system. 4,013,894, Cl. 250-569.000.

Foreman, Dave O. File card holder. 4,013,172, Cl. 211-51.000.

Forenade Fabriksverken: *See—*
Johansson, Lennart Johan Ivar; Wallberg, Eric Vilhelm; and Lindqvist, Bjorn Weine, 4,012,859.

Forrest Paschal Machinery Co.: *See—*
Milholen, William F.; and Lineberry, Cletus E., 4,013,183.

Forshufvud, Sten Harald Ragnar: *See—*
Blom, Rolf Helge; Forshufvud, Sten Harald Ragnar; and Skagerlund, Lars-Erik, 4,013,244.

Fory, Werner: *See—*
Bellus, Daniel; and Fory, Werner, 4,013,445.

Foster, Newton C., to Westinghouse Electric Corporation. Mica tape binder. 4,013,987, Cl. 336-206.000.

Foster Wheeler Energy Corporation: *See—*
Klein, Eric; and Goodman, Ronald Burton, 4,013,402.

Fournier, Jacques; and Nicolas, Michel, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Radar for short range measurements. 4,014,021, Cl. 343-14.000.

Fox, Joel Lawrence; and Marquardt, Eugene Everett, to International Business Machines Corporation. Configuration and control unit for a heterogeneous multi-system. 4,014,005, Cl. 340-172.500.

Fox, Thomas Joseph; and Harry, John Ernest, to National Research Development Corporation. Plasma torches. 4,013,866, Cl. 219-121.00P.

Frantzen, John J.; and Barton, Lee C., to Buckbee-Mears Company. Etching apparatus for accurately making small holes in thick materials. 4,013,498, Cl. 156-345.000.

Franz Manufacturing Co., Inc.: *See—*
Jones, Henry Ware, III, 4,012,901.

Frask, Theodore E.: *See—*
Mandel, Alan F.; Frask, Theodore E.; and Bedel, Denis E., 4,013,993.

Frei, Paul, to Griesser AG. Foldable rolling shutters. 4,013,113, Cl. 160-36.000.

Frey, Otto: *See—*
Dorre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,012,795.

Fridinger, Tomas L., to Minnesota Mining and Manufacturing Company. Inhibiting grass growth with 5 acetamido-2,4-dimethyltrifluoromethanesulfonanilide. 4,013,444, Cl. 71-76.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Schwarz, Wilhelm, 4,012,856.

Friedell, Morley V., to Martin Marietta Corporation. Flow control valve with isolated sequence control mechanism. 4,013,264, Cl. 251-56.000.

Friedrich, Ludwig: *See—*
Westermann, Albert; Zimmermann, Frank; Wuppermann, Dirk; Friedrich, Ludwig; and Raschack, Manfred, 4,013,663.

Fritze, Helmut: *See—*
Hultzsch, Kurt; and Fritze, Helmut, 4,013,609.

Froehlich, Helmut Hermann; and Lautenberger, William Jacob, to Du Pont de Nemours, E. I., and Company. Powdered cleaning composition of urea-formaldehyde. 4,013,594, Cl. 252-544.000.

Fromme, Hans-Georg; and Bottner, Gunter, to Thyssen Aufzuege GmbH. Coupling and braking device for tow pin driven floor trucks. 4,013,015, Cl. 104-172.0BT.

Frommer, Werner; Puls, Walter; Schafer, Dietmar; and Schmidt, Delf, to Farbenfabriken Bayer Aktiengesellschaft. Glycoside-hydrolase enzyme inhibitors. 4,013,510, Cl. 195-31.00R.

Froning, Edward C. Cannula connector and direction indicator means for injection system. 4,013,080, Cl. 128-347.000.

Frye, George J. Battery charging circuit. 4,013,934, Cl. 320-35.000.

Fryer, Austen John, to Hawker Siddeley Dynamics Limited. Electronic amplification. 4,013,889, Cl. 250-332.000.

Frymaster Corporation, The: *See—*
Westfall, John Lloyd, 4,013,861.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Yamaki, Yasuhito; and Aiage, Kunio, 4,013,056.

Fuji Photo Film Co., Ltd.: *See—*
Horie, Ikutaro; and Nagao, Kameji, 4,013,472.
Idota, Yoshio; Iwano, Haruhiko; Shirasu, Kazuo; and Matsushita, Sachio, 4,013,527.

Fuji Photo Optical Co., Ltd.: *See—*
Ando, Kunio; and Saito, Takemi, 4,013,339.

Fujikura Cable Works, Ltd., The: *See—*
Tanaka, Shigenobu; Yasuhara, Hikaru; and Oguchi, Munesuke, 4,013,948.

Fujita, Noriaki: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,013,509.

Fujiwara, Hideo; Ichinose, Yukio; and Kato, Kenji, to Hitachi, Ltd. Displacement - electricity transducer. 4,013,911, Cl. 340-199.000.

Fukawa, Hideaki: *See—*
Asahina, Masako; Kato, Hideki; and Fukawa, Hideaki, 4,013,731.

Fukumura, Toyoshi: *See—*
Sugimoto, Yukio; Okamasa, Makoto; and Fukumura, Toyoshi, 4,013,845.

Fuller, Robert Melvin, to Harris Corporation. Automatic report register. 4,014,004, Cl. 340-172.500.

Funston, Lowell G.: *See—*
Settle, Wayne L.; and Funston, Lowell G., 4,013,068.

Furuya, Nobuaki: *See—*
Kino, Yoshihiro; Furuya, Nobuaki; and Asanuma, Mitsuru, 4,013,834.

G. D. Searle & Co.: *See—*
Adelstein, Gilbert W.; Karim, Aziz; and Yen, Chung H., 4,013,668.
Lenz, George R., 4,013,644.
Lenz, George R., 4,013,666.
Nysted, Leonard N., 4,013,643.
Yen, Chung H., 4,013,667.

G.K.N. Group Services Limited: *See—*
Sellors, Roland George Ronald; and Cooksey, Raymond, 4,013,115.
G.K.N. Windsor Limited: *See—*
Smith, Samuel Charles Henry, 4,013,392.
Gaal, Otto, to Egyesult Izzolampa Es. Villamossagi Resveny tarsasag. Phase adjustment apparatus. 4,013,163, Cl. 198-575.000.
Gabriels, Andre, to Fabrique Nationale Herstal S.A. Throwing device for grenades. 4,013,011, Cl. 102-65.200.
Gage, Lonnie L. Oil well pump. 4,013,387, Cl. 417-554.000.
Gaines, George L., Jr.: *See—*
Lavallee, Francois A.; LeGrand, Donald G.; and Gaines, George L., Jr., 4,013,414.
Galiano, Francis R.: *See—*
Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., 4,013,751.
Galinke, Joachim: *See—*
Engelskirchen, Konrad; and Galinke, Joachim, 4,013,821.
Galvez, Buenanventura B.: *See—*
Moyle, Maurice; Galvez, Buenanventura B.; Pease, Eric C.; and Logan, Alan, 4,013,540.
Ganellin, Charon Robin: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,013,678.
Durant, Graham John; Ganellin, Charon Robin; and Parsons, Michael Edward, 4,013,659.
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,013,769.
Ganem, Charles F.: *See—*
Beswick, Paul R.; Berton, Paul W.; Ganem, Charles F.; and Johnson, Clark E., Jr., 4,013,239.
Garcia Corporation: *See—*
Begey, Jean-Marie; and Neau, Alain, 4,013,304.
Gardels, John H. Pipe turning tool. 4,013,313, Cl. 294-17.000.
Gardner, Denys. Anti-skid footwear. 4,012,855, Cl. 36-29.000.
Gargini, Eric John, to Communications Patents Limited. Wired broadcasting systems. 4,013,963, Cl. 325-308.000.
Garland, James J.: *See—*
Granda, Jose E.; Quinlan, John J.; and Garland, James J., 4,013,597.
Garshelis, Ivan J. Pressure gauge and flow meter. 4,012,959, Cl. 73-398.00R.
Gartner, Klaus W.: *See—*
Uyeda, Tim M., 4,012,991.
Gaskin, Graham Edward, to Ransomes Sims & Jefferies Limited. Vehicle steering mechanisms. 4,013,301, Cl. 280-95.00R.
Gasper, Kenneth E.: *See—*
Ward, William J.; and Gasper, Kenneth E., 4,013,761.
Gates, Walter C., Jr.: *See—*
Suggitt, Robert M.; and Gates, Walter C., Jr., 4,013,729.
Gavrilovic, Dragan Milan, to RCA Corporation. Liquid crystal compounds and electro-optic devices incorporating them. 4,013,582, Cl. 252-299.000.
Gebhardt, Hans; and Prahl, Franz, to Knorr-Bremse GmbH. Disc brake cooling structure. 4,013,146, Cl. 188-71.600.
Geiger, David H. Laminated fabric. 4,013,812, Cl. 428-245.000.
Geiger, Rolf: *See—*
Obermeier, Rainer; and Geiger, Rolf, 4,013,628.
Wissmann, Hans; Geiger, Rolf; Lindner, Ernst; and Scholkens, Bernward, 4,013,791.
Gellatly, Walter L. Fishing pole holder. 4,012,861, Cl. 43-15.000.
Geller, David, to Wico Corporation. Electronic door lock. 4,013,930, Cl. 361-172.000.
Gellert, Jobst Ulrich. Valve-gated injection molding mechanism. 4,013,393, Cl. 425-245.00R.
Gencey, Robert E.: *See—*
Claude, Pierre M. R.; Gencey, Robert E.; Mottry, Jean-Paul; and Cayre, Rene H., 4,013,009.
Gendron, George J., to Raymond International Inc. Bridge beam tower erection methods and apparatus. 4,012,917, Cl. 61-91.000.
General Electric Company: *See—*
Abolins, Visvaldis; and Holub, Fred F., 4,013,613.
Brown, Richard N., 4,013,199.
Corbley, Eugene K., 4,013,919.
Herzog, Josef, 4,013,378.
Hesler, Joseph P.; and Korzekwa, Samuel M., 4,013,936.
Hwang, Ying-Chen; Peil, William; and Zeigler, John F., III, 4,014,038.
James, Freeman D., 4,013,141.
Joss, Roger V.; Semonchik, William; and Unwin, Arthur H., 4,013,856.
Lavallee, Francois A.; LeGrand, Donald G.; and Gaines, George L., Jr., 4,013,414.
McCoy, Daniel J., 4,013,938.
Miklas, Frank C., 4,013,198.
Patterson, Hubert A., 4,013,959.
Quine, John P., 4,013,974.
Schindler, Donald R., 4,013,848.
Schneider, Harold N.; Titus, Charles H.; and Wittle, J. Kenneth, 4,013,538.
Summers, Glen H., 4,013,870.
General Foods Corporation: *See—*
Ray, George C., 4,013,188.
Reesman, Stanley H., 4,013,802.
General Motors Corporation: *See—*
Balsley, Richard L.; and Faix, Louis J., 4,013,054.
Harned, John L., 4,012,942.
Harned, John L., 4,013,047.
Kern, Otto Andrew, 4,012,807.
King, Donald J., 4,013,326.
King, Jack B., 4,013,218.
Kopetzki, Nikolaus; and Mykolenko, Petro, 4,013,117.
Kronenberger, Paul E.; and Smith, Robert, 4,013,434.
Lemmer, Harold G., 4,013,570.
Oswald, Lawrence J., 4,013,302.
Genesco. Inc.: *See—*
Turner, Newton C., Jr., 4,012,853.
Genev, Ivan Vassilev: *See—*
Georgiev, Assen Yordanov; and Genev, Ivan Vassilev, 4,013,401.
Genevieve I. Hanscom, Robert M. Magnuson and Lois J. Thomson, Trustees of the Estate of Roy M. Magnuson: *See—*
Crawford, Lynn D., 4,012,999.
Daugherty, Ralph K.; and Crawford, Lynn D., 4,012,998.
Georgiev, Assen Yordanov; and Genev, Ivan Vassilev, to DSO "Cherna Metalurgia". Apparatus for preheating a raw material charge for application to an electric furnace. 4,013,401, Cl. 432-164.000.
Gerber Products Company: *See—*
Smalligan, Wayne J.; Kelly, Vincent J.; and Enad, Estela G., 4,013,799.
Gerdes, Theodor, to Blau KG Fabrik fur Kraftfahrzeugteile. Lockable closure cap. 4,013,191, Cl. 220-203.000.
Gerigk, Gunter; Bittner, Klaus-Jurgen; and Kostner, Armin, to Hoechst Aktiengesellschaft. Sheathed tubular stick. 4,013,099, Cl. 138-109.000.
Germershausen, Raimond; and Becker, Wilfried, to Rheinmetall G.m.b.H. Variable-elevation field guns for mortar and cannon applications. 4,012,986, Cl. 89-17.000.
Gernhardt, Paul; Pohl, Siegfried; Danguillier, Wilhelm; and Grams, Wolfgang, to Dr. C. Otto & Comp. G.m.b.H. Slag bath generator. 4,013,427, Cl. 48-62.00R.
Gettert, Hans: *See—*
Berkel, Wilhelm; and Gettert, Hans, 4,013,431.
Gewerkschaft Eisenhutte Westfalia: *See—*
Jutte, Hans; Foik, Adolf; Babendererde, Siegmund H. F. L. M.; and Bokemeyer, Reinhard E. J., 4,012,916.
Gewiss, Lucien Victor, to Marc Wood S.A. Machine for manufacturing herringbone-pleated structures. 4,012,932, Cl. 72-187.000.
Giardina, Carmelo: *See—*
Berend, Steven P.; and Giardina, Carmelo, 4,012,854.
Giattino, Louis Robert, to Altus Corporation. Electronic safe arming and fuzing system. 4,013,012, Cl. 102-70.20R.
Giebel, Buddy E., to Union Camp Corporation. Postal tray. 4,013,213, Cl. 229-39.00R.
Giet, Claude, to Societe Anonyme: Produits Chimiques Ugine Kuhlmann. Acetylene-like black and process. 4,013,759, Cl. 423-445.000.
Giffin, Leverett William, to Boeing Company, The. Mechanical support apparatus for the stabilization of an inflatable escape slide. 4,013,247, Cl. 244-137.00P.
Giglberger, Dieter: *See—*
Bestenreiner, Friedrich; Giglberger, Dieter; and Weidkuhn, Gert, 4,013,356.
Gilberts, Alexander George, to Reliable Electric Company. Surge arrester. 4,013,927, Cl. 361-119.000.
Giller, Arnold: *See—*
Strauss, Richard; Giller, Arnold; Zacharowski, Dieter; and Wiener, Hans, 4,013,599.
Gillette Company, The: *See—*
Ascoli, Enzo, 4,012,837.
Hugly, Jean-Daniel, 4,013,330.
Gilson Bros. Co.: *See—*
Enters, Edward W.; and Itle, Mark J., 4,012,963.
Gingras, Antoine. Fountain tooth-brush. 4,013,370, Cl. 401-175.000.
Girling Limited: *See—*
Crabtree, Norman, 4,013,150.
Givaudan Corporation: *See—*
Naegeli, Peter, 4,013,711.
Naegeli, Peter, 4,013,726.
Shaffer, Gary W.; Tornell, Irene; and Purzycki, Kenneth L., 4,013,593.
Gladieux, Norman K.; and Miller, James W., to Libbey-Owens-Ford Company. Apparatus for manufacture of float glass. 4,013,438, Cl. 65-94.000.
Glass, John R., to Mobil Oil Corporation. Temperature control device. 4,013,872, Cl. 219-497.000.
Glaxo Laboratories Limited: *See—*
Johnson, Martin Godfrey; Turnbull, John Peter; and Crisp, Harold Alfred, 4,013,680.
Wilson, Edward McKenzie; and Curran, Adrian Charles Ward, 4,013,645.
Gleason, John Gerald, to SmithKline Corporation. Pharmaceutical compositions comprising substituted phenylglycylcephalosporins and methods of treating bacterial infections. 4,013,764, Cl. 424-246.000.
Glieneck, Klaus: *See—*
Steigerwald, Karl Heinz; Konig, Dietor; Scheffels, Wilhelm; and Glieneck, Klaus, 4,013,261.
Gocke, Eberhard; and Vollmer, Rudolf, to Braukmann Armaturen AG. Valve structure. 4,013,088, Cl. 137-116.000.
Goddard, Stephen A. A.: *See—*
Hess, Richard E.; Steinbrecher, Ronald A.; and Goddard, Stephen A. A., 4,013,293.

Godet, Sidney, to International Telephone and Telegraph Corporation. Quadraphase modulator. 4,013,960, Cl. 325-139.000.

Goebel, Klaus Karl-Heinz. Articulated netting, particularly for shuttering. 4,013,114, Cl. 160-330.000.

Goens, Duane N.; and Kruesi, Paul R., to Cyprus Metallurgical Processes Corporation. Process for the recovery of cuprous chloride in the presence of metal impurities. 4,013,457, Cl. 75-104.000.

Goffe, Frederick William Frank; and Pilkington, Donald James, to Shoe & Allied Trades Research Association, The. Measuring method and apparatus. 4,012,943, Cl. 73-37.700.

Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., to Xerox Corporation. Migration imaging system. 4,013,462, Cl. 96-1.0PS.

Gold, Heinrich: *See—*
Wolfrum, Gerhard; and Gold, Heinrich, 4,013,631.

Goldstein, Abe: *See—*
Barrett, Carl R., Jr.; and Goldstein, Abe, 4,014,020.

Goldstein, Leon; Katzir (Katchalski), Ephraim; Levin, Yehuda; and Blumberg, Shmaryahu, to Yeda Research & Development Co. Ltd. Immobilized enzymes. 4,013,511, Cl. 195-63.000.

Goldstein, Raymond: *See—*
Vali, Victor; Shorthill, Richard W.; Goldstein, Raymond; and Krogstad, Reuben S., 4,013,365.

Goltsos, Costas E., to Teckton, Inc. Selectively ventable food package and micro-wave shielding device. 4,013,798, Cl. 426-107.000.

Golumbic, Harvey J., to Vinyl-Chem International, Inc. Method for repairing pigmented and textured flexible materials. 4,013,495, Cl. 156-98.000.

Gondek, John T. Shower head. 4,013,230, Cl. 239-499.000.

Goode, George E.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,013,837.

Goodfellow, Andrew Culross: *See—*
Juriss, Ivan Bertram; Hay, Roger Douglas; Goodfellow, Andrew Culross; Townson, Thomas; and Hay, Keith Eric, 4,012,882.

Goodman, Ronald Burton: *See—*
Klein, Eric; and Goodman, Ronald Burton, 4,013,402.

Gorai, Tokio: *See—*
Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, 4,013,430.

Gordon, Ronald S.: *See—*
Jatkar, Arun D.; Cutler, Ivan B.; Virkar, Anil V.; and Gordon, Ronald S., 4,013,477.

Gordon, Wolfgang; Leugering, Hans Joachim; and Schaefer, Horst, to Hoechst Aktiengesellschaft. Process for the manufacture of hydrophilic polyolefin fibers containing inorganic pigment. 4,013,617, Cl. 260-42.550.

Goreham, Kenneth A.; and Perry, John R., to Smiths Industries Limited. Methods of manufacture of semiconductor bodies. 4,013,746, Cl. 264-66.000.

Gormar, Helmut: *See—*
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.

Gotoh, Iwao: *See—*
Dohi, Takashi; Ohara, Kenichi; and Gotoh, Iwao, 4,013,933.

Gott, Willie Gray. Portable water filter. 4,013,562, Cl. 210-232.000.

Gottfried Bischoff Bau kompl.: *See—*
Kleeberg, Ulrich; and Leimkuhler, Jurgen, 4,013,455.

Gouret, Claude J.: *See—*
Fauran, Claude P.; Eberle, Jeannine A.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,013,768.

Goverde, Ludovicus Jacobus, to Ontario Tool Design Inc. Hockey stick. 4,013,288, Cl. 273-67.00A.

Grabb, Nicholas G., to Varta Batteries Limited. Handle construction for batteries. 4,013,819, Cl. 429-187.000.

Grach, Herbert: *See—*
Reidelbach, Willi; Grach, Herbert; Lutze, Hans; and Weidemann, Dieter, 4,013,317.

Graff, Theodore S.: *See—*
Eachus, Joseph J.; Graff, Theodore S.; and Seggelin, Douglas H., 4,013,835.

Graham, John C., to Hooker Chemicals & Plastics Corporation. Process for the preparation of monochlorotoluene. 4,013,730, Cl. 260-650.00R.

Graham, Robert O.; and Rauenbuehler, John A., to Cutler-Hammer, Inc. Three-phase current transformer. 4,013,985, Cl. 336-5.000.

Grams, Wolfgang: *See—*
Gernhardt, Paul; Pohl, Siegfried; Danguillier, Wilhelm; and Grams, Wolfgang, 4,013,427.

Granberg, Elof. Adjustable chainsaw file guide and holder. 4,012,969, Cl. 76-36.000.

Granda, Jose E.; Quinlan, John J.; and Garland, James J., to ARCO Polymers, Inc. Fast cooling styrene polymer foams. 4,013,597, Cl. 260-2.50B.

Granger, Rene; Labsley, Alain; and Rolland, Serge, to Brevatome. Composite superconducting materials. 4,013,591, Cl. 252-512.000.

Granitz, Fritz; Robiczek, Gunther; Jabkowski, Fridolin; and Stoger, Franz, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alphine Montan Aktiengesellschaft. Method of exchanging supporting or driving rollers in a continuous casting plant and apparatus for carrying out the method. 4,012,825, Cl. 29-427.000.

Grassme, Ulrich, to Siemens Aktiengesellschaft. Time switch device for X-ray diagnostic apparatus. 4,013,036, Cl. 116-129.00T.

Gray, Robert C. Magnetic braking and clutch system. 4,013,241, Cl. 242-84.52B.

Grebner, Stuart W.; Johnson, James V.; and Josemans, Leonardus J., to Cutler-Hammer, Inc. Rocker switch with integral off lock. 4,013,858, Cl. 200-321.000.

Green, Mitchell V.; Akita, Yukio; and Tachikawa, Mitsuji, to Copyer Co., Ltd. Copying machine. 4,013,285, Cl. 271-261.000.

Greene, Marvin, to Cities Service Company. Upgrading solid fuel-derived tars produced by low pressure hydropyrolysis. 4,013,543, Cl. 208-50.000.

Greenfield, Charles; Casparian, Robert E.; and Bonanno, Anthony J., to Hanover Research Corporation. Apparatus and process for the pyrolysis of waste solids concentrates. 4,013,516, Cl. 201-2.500.

Greiner, Yvan: *See—*
Jucker, Erich; Greiner, Yvan; and Lehmann, Andre, 4,012,941.

Gresham, John T.: *See—*
Castrantas, Harry Marcus; and Gresham, John T., 4,013,575.

Grieger, Dieter: *See—*
Dolves, Jurgen; and Grieger, Dieter, 4,013,831.

Griesser AG: *See—*
Frei, Paul, 4,013,113.

Griffin, Steven M.: *See—*
Covington, Morris T.; and Griffin, Steven M., 4,012,944.

Grigoleit Company, The: *See—*
Howie, Robert K., Jr., 4,012,806.

Grinder, Nils Olle: *See—*
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,487.
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,488.

Grisanti, Giampiero: *See—*
Riva, Mario; Toscano, Luciano; Grisanti, Giampiero; and Bianchetti, Alberto, 4,013,679.

Groeger, Ingo, to Siemens Aktiengesellschaft. Circuit arrangement for placing information in a programmable ECL read only memory. 4,014,007, Cl. 340-173.00R.

Groeger, Ingo; and Scharbert, Juergen, to Siemens Aktiengesellschaft. Circuit arrangement for interference-free storage of information in a programmable read-only memory. 4,014,008, Cl. 340-173.00R.

Grohs, Gerhard L.: *See—*
Behrens, Hermann W.; Grohs, Gerhard L.; and Dailey, Charles L., 4,013,977.

Grosso, Donald S., to Teleco Inc. Rotation sensor for borehole telemetry. 4,013,945, Cl. 324-34.00R.

Grubbs, George B. Half-log wall construction. 4,012,876, Cl. 52-233.000.

Gruetzman, Stanley A., to Andersen Corporation. Method and composition for treating wood and coated wooden articles obtained thereby. 4,013,804, Cl. 427-33.000.

Grunwell, Joyce Francis: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,013,762.

Grunzweig & Hartmann und Glasfaser AG: *See—*
Falensky, Georg, 4,012,922.

Gryczka, Alfred J., to Microlife Technics, Inc. Bacterial compositions and process for fermentation of meat therewith. 4,013,797, Cl. 426-56.000.

GTE Automatic Electric Laboratories Incorporated: *See—*
Ice, George E., 4,013,949.

GTE Information Systems Incorporated: *See—*
Williams, Robert C., 4,013,836.

Guadalupi, Mario; Pagani, Giorgia; Zardi, Umberto; and Paris, Ivo, to Snam Progetti S.p.A. Integrated process for the production of urea. 4,013,718, Cl. 260-555.00A.

Gudelis, David A.; and Shaw, David H., to Exxon Research and Engineering Company. Partial predilution dilution chilling. 4,013,542, Cl. 208-33.000.

Guenther, William D., to Dana Corporation. Piston assembly. 4,013,057, Cl. 123-193.00P.

Guicheteau, Eugene H., to Honeywell Inc. Apparatus for converting a potential signal developed between two high impedance electrodes to a current signal and for transmitting this current signal to a remote location over a two wire transmission. 4,013,899, Cl. 307-235.00F.

Guida, Joseph. Magna comb. 4,013,084, Cl. 132-11.00R.

Guidosh, Edward F., to Westinghouse Electric Corporation. No-load tap changer switch with rack and pinion gear operating mechanism. 4,013,847, Cl. 200-18.000.

Guillerm, Jean; and Fondronnier, Jacques, to Centre Technique du Bois. Apparatus for cutting various materials. 4,013,108, Cl. 144-175.000.

Gulf Oil Canada Limited: *See—*
Moyle, Maurice; Galvez, Buenanventura B.; Pease, Eric C.; and Logan, Alan, 4,013,540.

Gulf Research & Development Company: *See—*
Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., 4,013,751.

Gulko, Arnold G. Engine powered by low boiling liquid. 4,012,911, Cl. 60-531.000.

Gundlach, Philip M., to Devtron Corporation. Absolute digital position measurement system. 4,014,015, Cl. 340-347.00P.

Gunther, W. H. H.: *See—*
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,013,528.
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,013,529.
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,013,530.

Guthlein, Werner: *See—*
Rittersdorf, Walter; Guthlein, Werner; Werner, Wolfgang; Rey, Hanz-Georg; and Rieckmann, Peter, 4,013,416.

Gutierrez, Eddie N.; and Reardon, Robert C., Jr., to Lever Brothers

Company. Process for the preparation of selectively halogenated ketones and ketals. 4,013,722, Cl. 260-593.00H.

Gyugyi, Laszlo: *See—*
Pelly, Brian R.; and Gyugyi, Laszlo, 4,013,937.

H. H. Robertson Company: *See—*
Brogan, Darryl Keefer; Haskins, Paul Leon; and Lindner, Robert George, 4,012,874.
Lindner, Robert G., 4,012,873.
Self, James M., 4,013,614.

H & S Enterprises, Inc.: *See—*
Hess, Richard E.; Steinbrecher, Ronald A.; and Goddard, Stephen A. A., 4,013,293.

Haas, Georges; Ferrini, Pier Giorgio; and Rossi, Alberto, to Ciba-Geigy Corporation. Arylchalcogeno-substituted aliphatic acids and esters. 4,013,708, Cl. 260-473.00G.

Haas, Georges; Jaques, Roland; Rossi, Alberto; and Ruegg, Martin, to Ciba-Geigy Corporation. Adamantyl phenoxy alkylamides. 4,013,719, Cl. 260-559.00B.

Haase, Jan R.; Eldredge, Carl H.; and Landholm, Richard A., to Eastman Kodak Company. Yellow azopyrazoline dye releasing redox compounds for photographic color transfer. 4,013,633, Cl. 260-162.000.

Haase, Jan R.: *See—*
Landholm, Richard A.; Haase, Jan R.; and Krutak, James J., Sr., 4,013,635.

Habitzreiter, Richard K.: *See—*
Erwin, Jerry D.; Duvall, Dale R.; and Habitzreiter, Richard K., 4,013,999.

Hackbarth, Daryl J.: *See—*
Dwyer, Sean G.; and Hackbarth, Daryl J., 4,013,607.

Haefliger, Walter: *See—*
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, 4,013,690.

Haese, Egon, to Dr. C. Otto & Comp. G.m.b.H. Process for removal of ammonia, hydrogen sulfide and hydrogen cyanide from gases containing these substances. 4,013,779, Cl. 423-573.00R.

Hafner, Reinhard; Wojik, Karl; and Schlenker, Gerhard, to Maschinenfabrik Augsburg-Nurnberg AG. Reciprocating piston engine construction, particularly multi-part cylinder and crankshaft connection arrangement. 4,013,058, Cl. 123-195.0AC.

Haga, Teruhide; Horigome, Koichi; and Ebisawa, Mitsuo. Chemical development of a silver halide emulsion containing an arylonium salt on a polyester film support. 4,013,469, Cl. 96-63.000.

Hagg, Arthur C., to Westinghouse Electric Corporation. Elevator system having a drive sheave with rigid but circumferentially compliant cable grooves. 4,013,142, Cl. 187-20.000.

Haile, Ernest. Convex mirror and frame. 4,013,351, Cl. 350-293.000.

Hall, W. Richard. Sewing machine feeder system. 4,013,026, Cl. 112-153.000.

Halloran, John Joseph, Jr., to Combustion Engineering, Inc. Pulverizer hydraulic drive. 4,013,235, Cl. 241-117.000.

Hamada, Sadanori: *See—*
Horigome, Toshinori; Hamada, Sadanori; and Sato, Takami, 4,013,917.

Hamamoto, Toshikazu: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,013,727.

Hamilton, James: *See—*
Smrekar, Donald E.; Bilan, Peter; and Hamilton, James, 4,012,992.

Hamm, Philip C.: *See—*
Olin, John F.; and Hamm, Philip C., 4,013,450.

Hammann, Ingeborg: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,657.
Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,794.
Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,795.

Hammarlund, Bertil; and Liss, Gote, to Asea Aktiebolag. Means for current measuring in static convertors. 4,013,952, Cl. 324-119.000.

Hampel, Gerald, to Optipatent AG. Method for making spectacle frame components. 4,013,747, Cl. 264-73.000.

Hanna, Belah N., to Hanna Enterprises, Inc. Disposal of liquid effluent from sewage treatment plants. 4,013,087, Cl. 137-110.000.

Hanna Enterprises, Inc.: *See—*
Hanna, Belah N., 4,013,087.

Hanover Research Corporation: *See—*
Greenfield, Charles; Casparian, Robert E.; and Bonanno, Anthony J., 4,013,516.

Hans Ehgartner, Firma: *See—*
Willinger, Karl, 4,012,819.

Hanscom, Genevieve L.: *See—*
Crawford, Lynn D., 4,012,999.
Daugherty, Ralph K.; and Crawford, Lynn D., 4,012,998.

Hansen, Ralph C.; and Miles, Ray P., to Libbey-Owens-Ford Company. Pneumatic shipping enclosures. 4,013,018, Cl. 105-468.000.

Hansen, Roger P.; and Vis, Larry J., to Display Pack, Inc. Plastic display container having hinged cover. 4,013,214, Cl. 229-44.00R.

Harada, Tatsuo; Moriyama, Shigeo; Kita, Toshiaki; and Yamaguchi, Hidenori, to Hitachi, Ltd. Concave diffraction grating and a manufacturing method thereof. 4,012,843, Cl. 33-19.00A.

Harbert, Charles A., to Pfizer Inc. Alkyl and benzyl 6,7-dialkoxy-2-methyl-4-oxo-1,2,3,4-tetrahydroquinoline-1-carboxylates. 4,013,662, Cl. 260-287.00K.

Hardman Incorporated: *See—*
Hardman, James V.; and Wolfman, Norman S., 4,013,386.

Hardman, James V.; and Wolfman, Norman S., to Hardman Incorporated. Positive displacement metering pump. 4,013,386, Cl. 417-489.000.

Hardtmann, Goetz E., to Sandoz, Inc. 1-(ω-haloalkyl)-isatoic anhydrides. 4,013,646, Cl. 260-244.00A.

Hare, Peter Edgar: *See—*
Stewart, Kent K.; Beecher, Gary R.; and Hare, Peter Edgar, 4,013,413.

Harned, John L., to General Motors Corporation. Borderline spark knock detector. 4,012,942, Cl. 73-35.000.

Harned, John L., to General Motors Corporation. Engine with combustion wall temperature control means. 4,013,047, Cl. 123-41.200.

Harnessed Energies, Inc.: *See—*
Lewis, John R., 4,013,946.

Harris, Brian W.: *See—*
Ragoonanan, Dulcie; and Harris, Brian W., 4,013,712.

Harris Corporation: *See—*
Fuller, Robert Melvin, 4,014,004.

Harris, Thomas Charles; and Hudson, Doyle Rayford, to Olinkraft, Inc. Bag push-off in-feed method. 4,012,886, Cl. 53-38.000.

Harroff, Marlin R., to Orthopedic Equipment Company, Inc. Body part immobilizer. 4,013,070, Cl. 128-80.00C.

Harry, John Ernest: *See—*
Fox, Thomas Joseph; and Harry, John Ernest, 4,013,866.

Harshaw Chemical Company, The: *See—*
Swinehart, Carl F.; and Packer, Herbert, 4,013,796.

Hartemann, Pierre, to Thomson-CSF. Surface wave electro-mechanical device. 4,013,983, Cl. 333-72.000.

Hartl, Alfons: *See—*
Reininger, Wolfgang; and Hartl, Alfons, 4,013,721.

Harunari, Kouichi, to Kokusan Kinzoku Kogyo Kabushiki Kaisha. Tumbler lock. 4,012,931, Cl. 70-363.000.

Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, to Sakata Shokai Ltd.; and Tokyo Broadcasting System, Inc. Electrophotographic typesetting method and apparatus therefor. 4,014,031, Cl. 354-5.000.

Haskins, Paul Leon: *See—*
Brogan, Darryl Keefer; Haskins, Paul Leon; and Lindner, Robert George, 4,012,874.

Hasty, James H., to Kendall Company, The. Sequential intermittent compression device. 4,013,069, Cl. 128-24.00R.

Hatch, Edward A.: *See—*
Kochey, Edward L., Jr.; and Hatch, Edward A., 4,013,024.

Hatcher, Charles S., to Phillips Petroleum Company. Method and apparatus for processing thermoplastic yarn. 4,012,816, Cl. 28-1.300.

Hattori, Hiroyuki: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,013,354.

Hattori, Seizi: *See—*
Ishii, Yoshikazu; Hattori, Seizi; and Inagaki, Nobuo, 4,013,534.

Hattori, Tadashi; Nakase, Takamichi; Tsubouchi, Hideo; and Iwata, Toshiharu, to Nippon Soken, Inc. Overheat preventing system for exhaust gas purifier of vehicles. 4,012,906, Cl. 60-277.000.

Hauser, Daniel: *See—*
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, 4,013,690.

Havranek, Jaroslav: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,013,505.

Havranek, Zdenek: *See—*
Burysek, Frantisek; Mikulecky, Karel; and Havranek, Zdenek, 4,013,242.

Hawaiian Sugar Planters' Association: *See—*
Karabinos, Joseph V.; and Nickell, Louis G., 4,013,681.

Hawker Siddeley Dynamics Limited: *See—*
Fryer, Austen John, 4,013,889.

Hawkins, Jerry D.: *See—*
Holk, Albert J., Jr.; and Hawkins, Jerry D., 4,012,935.

Hay, Keith Eric: *See—*
Juriss, Ivan Bertram; Hay, Roger Douglas; Goodfellow, Andrew Culross; Townson, Thomas; and Hay, Keith Eric, 4,012,882.

Hay, Roger Douglas: *See—*
Juriss, Ivan Bertram; Hay, Roger Douglas; Goodfellow, Andrew Culross; Townson, Thomas; and Hay, Keith Eric, 4,012,882.

Hayakawa, Shigeru: *See—*
Matsuoka, Tomizo; Matsuo, Yoshihiro; and Hayakawa, Shigeru, 4,013,592.

Hayashi, Hisao: *See—*
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawada, Yoshiyuki, 4,014,037.

Hayashi, Takao; and Shimizu, Akihiko, to Toyo Soda Manufacturing Co., Ltd. Method of preventing formation of popcorn chloroprene polymer. 4,013,580, Cl. 252-182.000.

Hayes, John C.: *See—*
Antos, George J.; Hayes, John C.; and Pollitzer, Ernest L., 4,013,735.
Pollitzer, Ernest L.; and Hayes, John C., 4,013,548.
Pollitzer, Ernest L.; and Hayes, John C., 4,013,738.

Hayward, Alan Thomas Joseph, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Location detecting devices and methods. 4,012,939, Cl. 73-3.000.

Heaton, Blaine. Curb forming machine. 4,013,375, Cl. 404-98.000.

Hebert, Jacques J.: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,013,493.

Hechtl, Wolfgang; Wohlfarth, Ernst; and Strasser, Alois, to Wacker-Chemie GmbH. Process for preparing elastomers. 4,013,611, Cl. 260-37.0SB.

Heckert, David C.: *See—*
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,573.
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,574.

Hein, Allyn J.; McMillan, William D.; and Ruseff, Walter Z., to Caterpillar Tractor Co. Pump control assembly having adjustable biasing means. 4,013,381, Cl. 417-222.000.

Heiser, Richard S.: *See—*
Uram, Robert; Marano, Ross T.; Heiser, Richard S.; and Surh, Jeong Y., 4,013,877.

Heitzer, Helmut: *See—*
Beck, Gunther; and Heitzer, Helmut, 4,013,674.

Heizer, Kenneth W.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,013,837.

Helbling, Edward. Hair dryer. 4,013,083, Cl. 132-9.000.

Hellemans, Albert Joseph, to AGFA-GEVAERT N.V. Self-adjusting web-handling device. 4,013,204, Cl. 226-21.000.

Henderson, William Arthur, Jr.; and Zweig, Arnold, to American Cyanamid Company. Stabilization of rubber with nickel complexes of thiobis(p-alkylphenols). 4,013,620, Cl. 260-880.00R.

Hendrix, Henry E. Fireplace lighter. 4,013,398, Cl. 431-344.000.

Heneveld, Lloyd A., trustee: *See—*
Dauser, William C., Jr., 4,013,332.

Henkel & Cie G.m.b.H.: *See—*
Engelskirchen, Konrad; and Galinke, Joachim, 4,013,821.

Hennrich, Helmut: *See—*
Magidson, Herbert; Huber, Otto L.; and Hennrich, Helmut, 4,013,750.

Henriksson, Sten Thore. Method of shaping fiber materials. 4,013,749, Cl. 264-128.000.

Hering, Gunter; and Engels, Werner, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Apparatus for guiding and seating a stirrer shaft for laboratory or industrial glass apparatus. 4,013,274, Cl. 259-102.000.

Herold, Heiko: *See—*
Muschelknautz, Edgar; Lenz, Hans; and Herold, Heiko, 4,012,895.

Herrera, John T. Welding torch tip and method. 4,013,227, Cl. 239-291.000.

Herrle, Karl: *See—*
Denzinger, Walter; Hofmann, Ernst; and Herrle, Karl, 4,013,825.

Herrmann, Franz-Josef: *See—*
Huschka, Hans; and Herrmann, Franz-Josef, 4,013,760.

Hertig, Urs W., to Welch Allyn, Inc. Optical bar code scanning device. 4,013,893, Cl. 250-568.000.

Herzig, Karl-Heinz, to BBC Brown, Boveri & Cie. High-voltage overhead transmission line with uniquely stressed elements. 4,013,826, Cl. 174-43.000.

Herzog, Josef, to General Electric Company. Axial flow turbine exhaust hood. 4,013,378, Cl. 415-209.000.

Hesler, Joseph P.; and Korzekwa, Samuel M., to General Electric Company. Regulated high voltage D.C. supply utilizing a plurality of D.C. to D.C. converter modules. 4,013,936, Cl. 321-2.000.

Hess, Heinrich: *See—*
Jaccard, Pierre-Ernest; and Hess, Heinrich, 4,013,343.

Hess, Richard E.; Steinbrecher, Ronald A.; and Goddard, Stephen A. A., to H & S Enterprises, Inc. Magnetic game apparatus. 4,013,293, Cl. 273-131.0AD.

Hesse, Wolfgang: *See—*
Hultzsch, Kurt; Hesse, Wolfgang; and Mummenthey, Hans-Dieter, 4,013,605.

Hewlett-Packard Company: *See—*
Ashkin, Peter B., 4,014,011.
Szente, Pedro Americo, 4,012,955.

Hibbard, George A. Hammer. 4,012,909, Cl. 60-371.000.

Higgins, Jerry G.: *See—*
Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., 4,013,604.

Hildebrand, Klaus W.: *See—*
Bertele, Ludwig; and Hildebrand, Klaus W., 4,013,349.

Hilfman, Lee, to UOP Inc. Hydrogenation of hydrocarbons utilizing a pretreated cobalt-molybdenum catalyst. 4,013,545, Cl. 208-111.000.

Hill, Harold J.: *See—*
Chiu, Ying C.; and Hill, Harold J., 4,013,569.

Hill, Robert W.: *See—*
Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., 4,013,751.

Hill, Roland John; and Jewell, Norman Thomas, to Rolls-Royce (1971) Limited. Gas dynamic lasers. 4,013,976, Cl. 331-94.50G.

Hill, William H., to Peter Strong & Company, Inc. Method and composition for treating teeth. 4,012,839, Cl. 32-15.000.

Hill, William J., to Morgan Construction Company. Coil handling pallet. 4,013,256, Cl. 248-346.000.

Hill, William J.: *See—*
Kinnicutt, Roger, Jr.; and Hill, William J., 4,013,177.

Hillyer, Anthony William, to Raleigh Industries Limited. Clutch and back pedal brake. 4,013,151, Cl. 192-6.00R.

Himmelmann, Wolfgang: *See—*
Bergthaller, Peter; Himmelmann, Wolfgang; and Schranz, Karl-Wilhelm, 4,013,468.

Hindersinn, Raymond R.: *See—*
Dorfman, Edwin; Schwartz, Willis T., Jr.; and Hindersinn, Raymond R., 4,013,815.

Hines, Amos, Jr. Pneumatic dispensing apparatus for finely divided dry substances. 4,013,196, Cl. 222-193.000.

Hinson, David C., to Owens-Illinois, Inc. Gas mixture for glow discharge device. 4,013,912, Cl. 313-226.000.

Hintz, Doran M.; and Steinberger, Lief H. Method of forming a wood boring tool. 4,012,970, Cl. 76-102.000.

Hirsch, Morti, to Active Fire Sprinkler Corporation. Overhead structural, fire extinguishing and ventilating system. 4,012,875, Cl. 52-168.000.

Histed, John A.; Lawford, William H.; and McLeod, Murray J., to Canadian International Paper Company. Method and apparatus for automatically and simultaneously controlling solution viscosity and brightness of a pulp during multi-stage bleaching. 4,013,506, Cl. 162-49.000.

Hitachi, Ltd.: *See—*
Fujiwara, Hideo; Ichinose, Yukio; and Kato, Kenji, 4,013,911.
Harada, Tatsuo; Moriyama, Shigeo; Kita, Toshiaki; and Yamaguchi, Hidenori, 4,012,843.
Kamigaki, Yoshiaki; Sunami, Hideo; and Itoh, Yokichi, 4,013,897.
Uno, Takeshi; Ikeda, Sadahiro; and Ueda, Hirotada, 4,014,000.

HNU Systems Inc.: *See—*
Driscoll, John N.; and Spaziani, Frederick F., 4,013,913.

Ho, Irving T.; and Yu, Hwa N., to International Business Machines Corporation. Single-electrode charge-coupled random access memory cell. 4,014,036, Cl. 357-24.000.

HOBEG Hochtemperaturreaktor-Brennelement GmbH: *See—*
Huschka, Hans; and Herrmann, Franz-Josef, 4,013,760.

Hochtief AG: *See—*
Jutte, Hans; Foik, Adolf; Babendererde, Siegmund H. F. L. M.; and Bokemeyer, Reinhard E. J., 4,012,916.

Hodogaya Chemical Co., Ltd.: *See—*
Takematsu, Tetsuo; Konnai, Makoto; Isogawa, Takayuki; and Kodama, Koshiro, 4,013,449.

Hoechst Aktiengesellschaft: *See—*
Finke, Manfred; and Kleiner, Hans-Jerg, 4,013,715.
Gerigk, Gunter; Bittner, Klaus-Jurgen; and Kostner, Armin, 4,013,099.
Gordon, Wolfgang; Leugering, Hans Joachim; and Schaefer, Horst, 4,013,617.
Hultzsch, Kurt; Hesse, Wolfgang; and Mummenthey, Hans-Dieter, 4,013,605.
Hultzsch, Kurt; and Fritze, Helmut, 4,013,609.
Martini, Thomas, 4,013,689.
Obermeier, Rainer; and Geiger, Rolf, 4,013,628.
Scherer, Otto; Horlein, Gerhard; and Schonowsky, Hubert, 4,013,452.
Strauss, Richard; Giller, Arnold; Zacharowski, Dieter; and Wiener, Hans, 4,013,599.
Wissmann, Hans; Geiger, Rolf; Lindner, Ernst; and Scholkens, Bernward, 4,013,791.

Hoehn, Hans, to E. R. Squibb & Sons, Inc. 2,5,7,8-Tetrahydro-1,2,4,5,6-pentaazabenzo[6,7]-cyclohepta[1,2,3-cd]-as-indacenes. 4,013,672, Cl. 260-296.00P.

Hoeschele, Guenther Kurt, to Du Pont de Nemours, E. I., and Company. Branched thermoplastic copolyesters. 4,013,624, Cl. 260-75.00R.

Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-ethyl-S-n-propyl-O-[pyridaz-(6)-on-(3)-yl]-thionothiolphosphoric acid esters. 4,013,657, Cl. 260-250.00P.

Hofmann, Ernst: *See—*
Denzinger, Walter; Hofmann, Ernst; and Herrle, Karl, 4,013,825.

Holden, Ronald L., to Therm-O-Disc Incorporated. Hermetically sealed motor protector. 4,013,988, Cl. 337-89.000.

Holk, Albert J., Jr.; and Hawkins, Jerry D., to Continental Can Company, Inc. Score and tool for forming the score. 4,012,935, Cl. 72-325.000.

Holland, Ronald: *See—*
Askew, Barry Anthony; and Holland, Ronald, 4,013,818.

Holmes, William F.: *See—*
Stone, Guthrie B.; and Holmes, William F., 4,012,934.

Holtz, Joachim, to Siemens Aktiengesellschaft. Circuit arrangement for a track-bound propulsion vehicle. 4,013,014, Cl. 104-148.0LM.

Holub, Fred F.: *See—*
Abolins, Visvaldis; and Holub, Fred F., 4,013,613.

Homeyer, Bernhard: *See—*
Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,795.

Honeywell Inc.: *See—*
Guicheteau, Eugene H., 4,013,899.
Payne, Robert L., 4,013,902.

Honeywell Information Systems, Inc.: *See—*
Eachus, Joseph J.; Graff, Theodore S.; and Seggelin, Douglas H., 4,013,835.
Sarinopoulos, George A.; McCarthy, Robert E.; and Waldrop, Joseph R., 4,013,928.

Hooker Chemicals & Plastics Corporation: *See—*
Dorfman, Edwin; Schwartz, Willis T., Jr.; and Hindersinn, Raymond R., 4,013,815.
Graham, John C., 4,013,730.

Lowe, Edward James; and Ridgway, Frederick Arthur, 4,013,756.

Hopkins, Melvyn D.: *See*—
Alverson, Thomas E.; Soles, Otto H.; Hopkins, Melvyn D.; and LeRow, Charles E., Jr., 4,013,853.

Hoppert, Bruce Noel; and Berghausen, Alfred, III, to Safetech, Inc. Recovery method for polyester still bottoms. 4,013,519, Cl. 203-33.000.

Horie, Ikutaro; and Nagao, Kameji, to Fuji Photo Film Co., Ltd. Photographic light-sensitive material. 4,013,472, Cl. 96-67.000.

Horigome, Koichi: *See*—
Haga, Teruhide; Horigome, Koichi; and Ebisawa, Mitsuo, 4,013,469.

Horigome, Toshinori; Hamada, Sadanori; and Sato, Takami, to Nippon Electric Company, Ltd. Coupled cavity type slow-wave structure for use in travelling-wave tube. 4,013,917, Cl. 315-3.500.

Horiike, Yoshio: *See*—
Ohkubo, Tsuneo; and Horiike, Yoshio, 4,013,841.

Horikoshi, Yoshiji, to Nippon Telegraph and Telephone Public Corporation. Apparatus for epitaxially growing a laminate semiconductor layer in liquid phase. 4,013,040, Cl. 118-415.000.

Horlein, Gerhard: *See*—
Scherer, Otto; Horlein, Gerhard; and Schonowsky, Hubert, 4,013,452.

Horning, Donald E.; Morris, Leeson R.; and Douglas, James L., to Bristol-Myers Company. $\Delta^{2,3}$-0-2-Isocephem-4-carboxylic acid and derivatives as antibacterial agents. 4,013,648, Cl. 260-244.00R.

Hornle, Reinhold: *See*—
Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, 4,013,481.

Horsey, William Charles, to CGR Medical Corporation. Drive for tiltable X-ray table. 4,013,019, Cl. 108-5.000.

Hoskinson, James H. Mixing device. 4,013,271, Cl. 259-2.000.

Hosokoshi, Kakuichiro; and Yoshida, Osamu, to Matsushita Electronics Corporation. Method of manufacturing color picture tubes using rotating light attenuator. 4,013,467, Cl. 96-36.100.

Hosterman, Craig; Michel, William E.; and Oldham, Dale R., to Engineering & Research Associates, Inc. Hand held electro-mechanism sealer. 4,013,860, Cl. 219-10.810.

Houle, James F.: *See*—
Babbitt, John M.; and Houle, James F., 4,013,696.

Hounsell, Melvin Wayne: *See*—
Spinner, Ernest Elliott; and Hounsell, Melvin Wayne, 4,013,422.

Howie, Robert K., Jr., to Grigoleit Company, The. Knob with deformable web. 4,012,806, Cl. 16-121.000.

Howmedica, Inc.: *See*—
Weisman, Sidney; and Cotter, Robert F., 4,012,796.

Hrebicek, James. Vehicle bumper assembly. 4,013,139, Cl. 180-108.000.

Hubbard, Wynant D. Backup warning device. 4,013,996, Cl. 340-70.000.

Huber, Arthur Elmer, to Procter & Gamble Company, The. Bleach tablet composition. 4,013,581, Cl. 252-186.000.

Huber, Otto L.: *See*—
Magidson, Herbert; Huber, Otto L.; and Hennrich, Helmut, 4,013,750.

Hudson, Doyle Rayford: *See*—
Harris, Thomas Charles; and Hudson, Doyle Rayford, 4,012,886.

Hudson, George D. Float-controlled valve. 4,013,091, Cl. 137-414.000.

Huelsman, Kenneth A., to Hughes Aircraft Company. Feedback controlled storage tube devices. 4,013,968, Cl. 328-124.000.

Hughes Aircraft Company: *See*—
Huelsman, Kenneth A., 4,013,968.

Hugin, Peter E., to Multilam Corporation. Multiple plate assembly for forming electrical connector or switch. 4,013,329, Cl. 339-9.00E.

Hugly, Jean-Daniel, to Gillette Company, The. Dual-standard electric plug. 4,013,330, Cl. 339-31.00R.

Hulette, Roger L.: *See*—
Ban, Thomas E.; Hulette, Roger L.; and Mittra, Subir K., 4,013,517.

Hultzsch, Kurt; Hesse, Wolfgang; and Mummenthey, Hans-Dieter, to Hoechst Aktiengesellschaft. Phenolic resins from alkyl substituted dimethylolphenols. 4,013,605, Cl. 260-29.300.

Hultzsch, Kurt; and Fritze, Helmut, to Hoechst Aktiengesellschaft. Resinous composition. 4,013,609, Cl. 260-33.6UA.

Hunnicutt, Jack B.: *See*—
Journot, Vida M.; Deyo, Charles R.; and Hunnicutt, Jack B., 4,012,852.

Hunt, Robert G.; and Edwards, Theodore B., to Summa Corporation. Inertial free-sight system. 4,012,989, Cl. 89-41.0EA.

Husar, Rudolph B.: *See*—
Macias, Edward S.; and Husar, Rudolph B., 4,013,888.

Huschka, Hans; and Herrmann, Franz-Josef, to HOBEG Hochtemperaturreaktor-Brennelement GmbH. Process for the production of isotropic pyrolytic carbon particles. 4,013,760, Cl. 423-449.000.

Hutchinson, Ronald G.; and Dillon, Paul J., to Simmons Company. Mattress foundation. 4,012,802, Cl. 5-247.000.

Hutchison, Stanley O.; and Mitchell, Neal L., to Chevron Research Company. Method for obtaining information from a well by use of a gas operated hydraulically actuated wire line packer. 4,013,124, Cl. 166-250.000.

Hutley, Michael Christopher: *See*—
Clapham, Peter Brian; and Hutley, Michael Christopher, 4,013,465.

Hutterer, Karl, to Dornier System GmbH. Shipping container. 4,013,170, Cl. 206-521.000.

Huvey, Michel: *See*—
Thiery, Jean; Chatard, Michel; Bonavent, Gerard; and Huvey, Michel, 4,013,100.

Hwang, Ying-Chen; Peil, William; and Zeigler, John F., III, to General Electric Company. Automatic gray scale control circuit for a color television receiver. 4,014,038, Cl. 358-29.000.

Hydraulic Drives, Inc.: *See*—
Weady, Andrew A.; and Denz, Jerome T., 4,013,166.

Hydroacoustics Inc.: *See*—
Wise, Boyd A., 4,013,319.

I. D. Engineering, Inc.: *See*—
Martens, Henry J.; and Vandebult, Jan, 4,012,813.

I.S.A.M. Istituto Sperimentale Auto e Motori S.p.A.: *See*—
Moscarini, Filippo, 4,013,194.

I.S.F. S.p.A.: *See*—
Cocozza, Salvatore, 4,013,075.

Ice, George E., to GTE Automatic Electric Laboratories Incorporated. Return loss test set. 4,013,949, Cl. 324-58.00B.

Ichihara, Isao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Buffering air-bag means. 4,013,305, Cl. 280-742.000.

Ichinose, Yukio: *See*—
Fujiwara, Hideo; Ichinose, Yukio; and Kato, Kenji, 4,013,911.

Iconex Systems Incorporated: *See*—
Karlson, Eskil L., 4,013,553.

Idota, Yoshio; Iwano, Haruhiko; Shirasu, Kazuo; and Matsushita, Sachio, to Fuji Photo Film Co., Ltd. Electrolytic oxidation of blix solution. 4,013,527, Cl. 204-151.000.

Igarashi, Takeo: *See*—
Yonemitsu, Eiichi; Igarashi, Takeo; Osaki, Naoto; Aoyama, Tetsuo; and Nakazato, Yukiya, 4,013,725.

Iida, Toshihide: *See*—
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,013,354.

Ikeda, Sadahiro: *See*—
Uno, Takeshi; Ikeda, Sadahiro; and Ueda, Hirotada, 4,014,000.

Iketani, Takashi: *See*—
Toyota, Hiroshi; Yamazaki, Toshio; and Iketani, Takashi, 4,013,017.

Ilin, Nikolai Pavlovich: *See*—
Bagdasarov, Khachik Saakovich; Ilin, Nikolai Pavlovich; and Starostin, Jury Alexandrovich, 4,013,421.

Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, to Nissan Motor Co., Ltd. Vehicle occupant restraining belt with device to provide an arrangement in which shoulder belt is prevented from touching seated occupant's neck. 4,013,306, Cl. 280-745.000.

Imai, Ko: *See*—
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,013,509.

Imaizumi, Norio: *See*—
Sakamoto, Jyunji; Imaizumi, Norio; and Shiratani, Eisuke, 4,013,903.

Imanishi, Shozo, to Aida Engineering Ltd. Work transfer and drive device in a transfer press. 4,012,937, Cl. 72-419.000.

IMC Chemical Group, Inc.: *See*—
Eggers, Warren J., 4,013,409.

Imperial Chemical Industries Limited: *See*—
Emsley, Alan Brian, 4,013,525.
Kay, Ian Trevor, 4,013,447.
Nicholson, Eric Samuel; and Ashworth, Brian Thomas, 4,013,720.
Paget, Hugh Patrick Dryhurst; Rogers, Leslie Richard; Royle, James Kenneth Davenport; Stansfield, James Frederick; and Topham, Arthur, 4,013,687.
Scott, Roger Hardiman, 4,013,521.

Imura, Toshinori, to Minolta Camera Kabushiki Kaisha. Single lens reflex camera. 4,014,034, Cl. 354-152.000.

Inagaki, Nobuo: *See*—
Ishii, Yoshikazu; Hattori, Seizi; and Inagaki, Nobuo, 4,013,534.

Incom International Inc.: *See*—
Cantley, George A.; and Litzell, John E., 4,013,034.
Olsen, Roger Fred, 4,013,155.

Industrialised Building Systems Limited: *See*—
Juriss, Ivan Bertram; Hay, Roger Douglas; Goodfellow, Andrew Culross; Townson, Thomas; and Hay, Keith Eric, 4,012,882.

Ingold, Lester Donald, to Weyerhaeuser Company. Net tending system. 4,013,042, Cl. 119-3.000.

Inoue-Japan Research Inc.: *See*—
Inoue, Kiyoshi, 4,013,526.

Inoue, Kiyoshi, to Inoue-Japan Research Inc. Electrochemical grinding with a conductivity-controlled wheel electrode. 4,013,526, Cl. 204-129.460.

Inoue, Sakae: *See*—
Masuda, Kinji; Saigo, Hideaki; Naito, Kazuo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,013,817.

Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf: *See*—
Fabre-Curtat, Michel; and Thiery, Jean, 4,013,205.
Thiery, Jean; Chatard, Michel; Bonavent, Gerard; and Huvey, Michel, 4,013,100.

Institute of Microbiology and Hygiene of the University of Montreal, The: *See*—
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavlanis, Vytautas; and Schrenk, Heinrich Maria, 4,013,770.

Intel Corporation: *See*—
Boleky, Edward J.; and Scott, Charles, 4,013,484.

Oldham, William G., 4,013,489.
International Automated Machines, Inc.: *See*—
Chung, Yun-Hoon, 4,012,889.
International Business Machines Corporation: *See*—
Fox, Joel Lawrence; and Marquardt, Eugene Everett, 4,014,005.
Ho, Irving T.; and Yu, Hwa N., 4,014,036.
Ko, Wen-Chuang; and Sawatzky, Erich, 4,013,891.
Kubilius, Fabian; Pavlovic, Gary Frank; and Woolf, Jerome, 4,013,039.
Lane, Ramon; and Taub, Howard Hyman, 4,014,029.
Ma, Tso-Ping; and Ma, William Hsioh-Lien, 4,013,485.
International Harvester Company: *See*—
Vidakovic, Aleksandar, 4,013,112.
Wilkinson, John R., 4,013,129.
International Nickel Company, Inc., The: *See*—
Danyliw, George Jack, 4,013,273.
Floreen, Stephen, 4,013,458.
International Standard Electric Corporation: *See*—
Wood, Alan F. B.; Rogers, Graham; and Tuckett, Edward G., 4,013,982.
International Telephone and Telegraph Corporation: *See*—
Bornmann, Robert Edward; Cowan, John Richard; and Schneider, Mark Joel, 4,013,879.
Godet, Sidney, 4,013,960.
Parker, Ernest G.; Lucanera, Constantino; and Craine, Richard W., 4,014,024.
Saxon, Bruce Ronald, 4,013,844.
Interpile USA, Inc.: *See*—
Poma, Luis, 4,012,915.
Iqbal, Abul F. M.: *See*—
Sulzbach, Reinhard A.; and Iqbal, Abul F. M., 4,013,661.
Irwin, Roy E.; and Aufhauser, Alfred. Method and apparatus for wax deoiling. 4,013,541, Cl. 208-32.000.
Ishii, Yoshikazu; Hattori, Seizi; and Inagaki, Nobuo, to Nippon Telegraph and Telephone Public Corporation. Method of making a magnetic oxide film. 4,013,534, Cl. 204-192.00M.
Isogawa, Takayuki: *See*—
Takematsu, Tetsuo; Konnai, Makoto; Isogawa, Takayuki; and Kodama, Koshiro, 4,013,449.
Ital-Rubber S.r.l.: *See*—
Benigni, Italiana, 4,013,499.
ITL Industries, Inc.: *See*—
Pillon, Austin E., 4,013,192.
Itle, Mark J.: *See*—
Enters, Edward W.; and Itle, Mark J., 4,012,963.
Ito, Yasunori: *See*—
Nakano, Kiyokazu; Yamamoto, Hiroshi; and Ito, Yasunori, 4,013,364.
Itoh, Yokichi: *See*—
Kamigaki, Yoshiaki; Sunami, Hideo; and Itoh, Yokichi, 4,013,897.
Iwaki Co., Ltd.: *See*—
Oikawa, Kunihiro, 4,013,384.
Iwano, Haruhiko: *See*—
Idota, Yoshio; Iwano, Haruhiko; Shirasu, Kazuo; and Matsushita, Sachio, 4,013,527.
Iwata, Toshiharu: *See*—
Hattori, Tadashi; Nakase, Takamichi; Tsubouchi, Hideo; and Iwata, Toshiharu, 4,012,906.
J. T. Thorpe Company: *See*—
Byrd, Carlisle O., Jr., 4,012,877.
J. W. Fay & Son, Inc.: *See*—
Fay, Rudolph J., 4,013,234.
Jabkowski, Fridolin: *See*—
Granitz, Fritz; Robiczek, Gunther; Jabkowski, Fridolin; and Stoger, Franz, 4,012,825.
Jablonsky, Erich, to Zahnradfabrik Friedrichshafen AG. Auxiliary power steering system. 4,012,993, Cl. 91-371.000.
Jabs, Gert; and Loew, Gunther, to Bayer Aktiengesellschaft. Process for the production of polyisocyanates. 4,013,701, Cl. 260-453.0AR.
Jaccard, Pierre-Ernest; and Hess, Heinrich, to Societe Suisse pour l'Industrie Horlogere Management Services, S.A. Electro-optical display arrangement with storage effect using a solid electrolyte. 4,013,343, Cl. 350-160.00R.
Jacobson, James W. Manually actuated, self-expiring, temporary override apparatus and method for thermostatic system. 4,013,219, Cl. 236-46.00R.
Jaconelli, Pierre, to A.V.D. A Votre Disposition. Process and apparatus for the manufacture of dry solid molasses. 4,013,482, Cl. 127-9.000.
Jagau, Heinz: *See*—
Moeller, Heinz J.; and Jagau, Heinz, 4,013,390.
James Cash Machine Co.: *See*—
Cash, David R., 4,013,027.
James, Freeman D., to General Electric Company. Means for lubricating a mechanism disposed within a rotating shaft. 4,013,141, Cl. 184-6.110.
Jan Hardware Manufacturing, Inc.: *See*—
Lieberman, Lester; and Oddo, Ralph, 4,012,966.
Japanese National Railways: *See*—
Toyota, Hiroshi; Yamazaki, Toshio; and Iketani, Takashi, 4,013,017.
Jaques, Roland: *See*—
Haas, Georges; Jaques, Roland; Rossi, Alberto; and Ruegg, Martin, 4,013,719.
Jatkar, Arun D.; Cutler, Ivan B.; Virkar, Anil V.; and Gordon, Ronald S., to University of Utah, The. Method for preparing dense, β-alumina ceramic bodies. 4,013,477, Cl. 106-73.400.
Jenaer Glaswerk Schott & Gen.: *See*—
Meyer, Helmut, 4,013,478.
Jess, Thurman S., to Baxter Travenol Laboratories, Inc. Drip chamber for intravenous administration. 4,013,072, Cl. 128-214.00C.
Jewell, Norman Thomas: *See*—
Hill, Roland John; and Jewell, Norman Thomas, 4,013,976.
Jinotti, Walter Joseph. Fluid-dispensing apparatus having level control and alarm means. 4,014,010, Cl. 340-244.00A.
Johansson, Lennart Johan Ivar; Wallberg, Eric Vilhelm; and Lindqvist, Bjorn Weine, to Forenade Fabriksverken. Mechanism for firearms. 4,012,859, Cl. 42-75.00C.
John Burton Machine Corporation: *See*—
Rice, Harold B., 4,012,972.
John Z. DeLorean Corporation: *See*—
DeLorean, John Z.; and Dirks, Chauncey L., 4,013,102.
Johns, Robert W., to World Oil Mining Ltd. Hook plough apparatus for longwall mining. 4,013,320, Cl. 299-33.000.
Johnson, Clark E., Jr.: *See*—
Beswick, Paul R.; Berton, Paul W.; Ganem, Charles F.; and Johnson, Clark E., Jr., 4,013,239.
Johnson, James V.: *See*—
Grebner, Stuart W.; Johnson, James V.; and Josemans, Leonardus J., 4,013,858.
Johnson & Johnson: *See*—
Buck, Carl J., 4,013,703.
Kalwaites, Frank; and Doviak, Peter L., 4,013,752.
Johnson, Martin Godfrey; Turnbull, John Peter; and Crisp, Harold Alfred, to Glaxo Laboratories Limited. Process for the preparation of aromatic α-keto carboxylic acids. 4,013,680, Cl. 260-332.20A.
Johnson, Raymond Neils. Load-compacting vehicle. 4,013,181, Cl. 214-82.000.
Johnson, Rollin W. Prefabricated panels for sub-surface sewage effluent and waste water disposal. 4,013,559, Cl. 210-151.000.
Johnston, John O'Neal: *See*—
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,013,762.
Johst, Wolfgang: *See*—
Warncke, Niels; and Johst, Wolfgang, 4,012,809.
Jolles, Pierre; and Migliore-Samour, Daniele, to Agence Nationale de Valorisation de la Recherche (ANVAR). Watersoluble extracts of corynebacteria, process for obtaining them and their use. 4,013,788, Cl. 424-92.000.
Jones, Clarence O., Jr., to Niagara Machine & Tool Works. Mechanical clutch for cyclic machines. 4,013,152, Cl. 192-24.000.
Jones, Donald H.; and McNally, Paul F., to Contraves-Goerz Corporation. Synchronized multispeed transducer position indicating system. 4,014,014, Cl. 340-347.0SY.
Jones, Everett E., to Boeing Company, The. Metal honeycomb welding apparatus and method. 4,013,865, Cl. 219-117.0HD.
Jones, Henry Ware, III, to Franz Manufacturing Co., Inc. Damage-resistant mechanical metronome. 4,012,901, Cl. 58-130.00R.
Jones, Jerry C., deceased: *See*—
Fischer, Paul W.; Jones, Jerry C., deceased; Pyle, Delbert E.; and Pye, Stephen, 4,013,568.
Jones, Shirley J., executrix: *See*—
Fischer, Paul W.; Jones, Jerry C., deceased; Pyle, Delbert E.; and Pye, Stephen, 4,013,568.
Jordan, Robert Kenneth. Coproduction of iron with methanol and ammonia. 4,013,454, Cl. 75-41.000.
Josemans, Leonardus J.: *See*—
Grebner, Stuart W.; Johnson, James V.; and Josemans, Leonardus J., 4,013,858.
Josephs, Richard M., to Sperry Rand Corporation. Fabrication of amorphous bubble film devices. 4,013,803, Cl. 427-8.000.
Joss, Roger V.; Semonchik, William; and Unwin, Arthur H., to General Electric Company. Push button assembly. 4,013,856, Cl. 200-314.000.
Jounot, said Vida M.: *See*—
Journot, Vida M.; Deyo, Charles R.; and Hunnicutt, Jack B., 4,012,852.
Journot, Vida M.; Deyo, Charles R.; and Hunnicutt, Jack B., to Jounot, said Vida M. Teaching apparatus. 4,012,852, Cl. 35-48.00R.
Jucker, Erich; Greiner, Yvan; and Lehmann, Andre, to Portescap. Method of and apparatus for measuring the amplitude of oscillation of the balance of a timepiece movement. 4,012,941, Cl. 73-6.000.
Judge, Francis John; and Stubbs, Joseph Morriss, to N.V. Internationale Octrooi Maatschappij "Octropa". Dehydration process. 4,012,845, Cl. 34-9.000.
Judice, Charles Norris, to Bell Telephone Laboratories, Incorporated. Method and arrangement for reducing the bandwidth and/or time required to transmit a dithered image. 4,013,828, Cl. 358-133.000.
Juelke, Charles V.: *See*—
Berkowitz, Sidney; and Juelke, Charles V., 4,013,757.
Juhasz, John Emil, to Rockwell International Corporation. Brake lining wear indicator. 4,013,143, Cl. 188-1.00A.
Juriss, Ivan Bertram; Hay, Roger Douglas; Goodfellow, Andrew Culross; Townson, Thomas; and Hay, Keith Eric, to Industrialised Building Systems Limited. Structural building panels. 4,012,882, Cl. 52-615.000.
Jutte, Hans; Foik, Adolf; Babendererde, Siegmund H. F. L. M.; and Bokemeyer, Reinhard E. J., to Gewerkschaft Eisenhutte Westfalia; and Hochtief AG. Apparatus for constructing underground tunnels. 4,012,916, Cl. 61-85.000.
Kablaoui, Mahmoud S.; and Love, Richard F., to Texaco Inc. Prepara-

tion of carboxylic acids from salts of nitroketones. 4,013,697, Cl. 260-413.000.
Kabushiki Kaisha Daini Seikosha: *See*—
Matsuura, Eiichi; and Tsukada, Nobuo, 4,012,899.
Kabushiki Kaisha Seikosha: *See*—
Yoshizawa, Keiichi, 4,012,898.
Kabushikikaisha Yokogawa Denki Seisakusho: *See*—
Kataoka, Koji; and Uchiike, Hisayuki, 4,013,975.
Kaiser, Carl: *See*—
Colella, Donald F.; and Kaiser, Carl, 4,013,777.
Kaji, Isamu, to Maeda, Naoyuki. Semiconductor circuit device. 4,013,940, Cl. 323-22.00T.
Kakalec, Robert John, to Bell Telephone Laboratories, Incorporated. Cross inhibit circuit to prevent misfires of alternately triggered switching devices. 4,013,900, Cl. 307-252.00K.
Kakutani, Haruko: *See*—
Nakamura, Kenichi; and Kakutani, Haruko, 4,013,531.
Kalabukhova, Ljudmila Nikolaenva; Rudevskaya, Svetlana Ivanovna; Petrighenko, Alexandr Alexandrovich; and Smurova, Alberta Sergeevna. Parachute equipment. 4,013,248, Cl. 244-145.000.
Kali-Chemie Aktiengesellschaft: *See*—
Fischer, Hermann; Schindler, Hubert; Kuhrt, Winfried; and Weidenbach, Guenter, 4,013,587.
Kalinin, Lev Pavlovich: *See*—
Boshnyaga, Valery Anatolievich; Kalinin, Lev Pavlovich; and Postolaty, Vitaly Mikhailovich, 4,013,942.
Kalwaites, Frank; and Doviak, Peter L., to Johnson & Johnson. Method of manufacturing reticulate sheet material. 4,013,752, Cl. 264-154.000.
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, to Takeda Chemical Industries, Ltd. Production of L(+)-tartaric acid. 4,013,509, Cl. 195-30.000.
Kameswaran, Venkataraman: *See*—
Kupchan, S. Morris; and Kameswaran, Venkataraman, 4,013,664.
Kamibayashi, Akira: *See*—
Kosugi, Yoshitsugu; Suzuki, Hideo; and Kamibayashi, Akira, 4,013,512.
Kamigaki, Yoshiaki; Sunami, Hideo; and Itoh, Yokichi, to Hitachi, Ltd. Information signal transfer method and a charge transfer. 4,013,897, Cl. 307-221.00D.
Kaminstein, Bernard. Tennis racket. 4,013,289, Cl. 273-73.00D.
Kanda Tsushin Kogyo Co., Ltd.: *See*—
Tojo, Fumiaki, 4,013,957.
Kane, John L.; and Machlan, George R., to Owens-Corning Fiberglas Corporation. Production of organic fibers with inorganic cores. 4,013,435, Cl. 65-11.00W.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Nagoshi, Fumiya; Arakawa, Hideyuki; Uchino, Hayashi; Echigoya, Mitsuru; and Matsuo, Masaki, 4,013,608.
Kaneko, Kenzo: *See*—
Tomohiro, Akira; and Kaneko, Kenzo, 4,013,610.
Kao, Chih-Yu; and Kurth, Carl Ferdinand, to Bell Telephone Laboratories, Incorporated. Method and apparatus for interfacing digital and analog carrier systems. 4,013,842, Cl. 179-15.0FD.
Kao Soap Co., Ltd.: *See*—
Nakasone, Yumio; Abe, Miwako; and Mizutani, Hiroshi, 4,013,579.
Kapp, Wolfgang, to Deutsche Gesellschaft fur Schadlingbekampfung mbH. Phosphine-developing pesticide and process for production thereof. 4,013,790, Cl. 424-128.000.
Karabinos, Joseph V.; and Nickell, Louis G., to Hawaiian Sugar Planters' Association. Derivatives of thiophene. 4,013,681, Cl. 260-332.20C.
Karim, Aziz: *See*—
Adelstein, Gilbert W.; Karim, Aziz; and Yen, Chung H., 4,013,668.
Karlson, Eskil L., to Iconex Systems Incorporated. Fluid treatment method. 4,013,553, Cl. 210-28.000.
Kataoka, Koji; and Uchiike, Hisayuki, to Kabushikikaisha Yokogawa Denki Seisakusho. Variable resistance circuit. 4,013,975, Cl. 330-145.000.
Kato, Hideki: *See*—
Asahina, Masako; Kato, Hideki; and Fukawa, Hideaki, 4,013,731.
Kato, Kenji: *See*—
Fujiwara, Hideo; Ichinose, Yukio; and Kato, Kenji, 4,013,911.
Kato, Makoto: *See*—
Sato, Isao; and Kato, Makoto, 4,013,338.
Katsumoto, Kiyoshi; and Wuopio, Richard A., to Chevron Research Company. Process for preparing polypyrrolidone wherein polypyrrolidone is washed with 2-pyrrolidone. 4,013,626, Cl. 260-78.00P.
Katzir (Katchalski), Ephraim: *See*—
Goldstein, Leon; Katzir (Katchalski), Ephraim; Levin, Yehuda; and Blumberg, Shmaryahu, 4,013,511.
Kaufmann, Harold; and Sprick, Kenneth, to Di-Acro Division, Houdaille Industries, Inc. Work table roller support. 4,013,282, Cl. 269-289.0MR.
Kawada, Hiroitsu: *See*—
Murakami, Masuo; Kawada, Hiroitsu; Ohmura, Tadayoshi; and Sugiura, Hiroshi, 4,013,773.
Kawada, Yoshiyuki: *See*—
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawada, Yoshiyuki, 4,014,037.
Kawai, Yoshihisa, to Minolta Camera Kabushiki Kaisha. Device for adjusting starting position for transfer-type electrophotographic reproducing apparatus having belt-like photosensitive member. 4,013,358, Cl. 355-14.000.
Kawar, Faisal T., to Exxon Research and Engineering Company. Process for encapsulating particles by in-situ formation of a metal carbonate coating. 4,013,442, Cl. 71-28.000.
Kawata, Masayuki: *See*—
Tadokoro, Tomoo; and Kawata, Masayuki, 4,013,098.
Kay, Ian Trevor, to Imperial Chemical Industries Limited. Compositions containing herbicidal thiatriazinone derivatives and use thereof. 4,013,447, Cl. 71-91.000.
Kaynar Mfg. Co., Inc.: *See*—
Pagel, Paul V., 4,012,884.
Kearney & Trecker Corporation: *See*—
Lohneis, Earl R.; and Schachte, John J., 4,013,176.
Kechely, Raymond O. Apparatus for supporting and weighing patients in a sitting position. 4,013,135, Cl. 177-144.000.
Keefe, Jack D., to Monarch Marking Systems, Inc. Print wheel and method of making same. 4,013,005, Cl. 101-110.000.
Keeney, Malcolm S. Phonograph record storage and protection apparatus. 4,013,296, Cl. 274-42.00R.
Keith, James A., to Raytheon Company. Radiographic camera simulator. 4,012,850, Cl. 35-10.000.
Kelbel, Donald W., to Borg-Warner Corporation. Speed-sensitive differential mechanism. 4,012,968, Cl. 74-711.000.
Kelley Company, Inc.: *See*—
Catlett, John C., 4,012,804.
Kelly, Vincent J.: *See*—
Smalligan, Wayne J.; Kelly, Vincent J.; and Enad, Estela G., 4,013,799.
Kemp, Gail W. Rotary engine. 4,013,046, Cl. 123-8.270.
Kendall Company, The: *See*—
Dye, John F., 4,013,310.
Hasty, James H., 4,013,069.
Patel, Bhupendra C.; and Villari, Frank K., 4,013,064.
Kendall-Smith, Brian J.: *See*—
Boham, Ambrose C.; Davies, John C.; and Kendall-Smith, Brian J., 4,013,276.
Kennedy, Carver G.: *See*—
Schneiter, Fred E.; Dykstra, Philip R.; and Kennedy, Carver G., 4,013,010.
Kennedy, Robert J., Jr.; and Smith, Kendall S., II, to Lincoln Manufacturing Company, Inc. Breath guard canopy for serving unit. 4,013,880, Cl. 240-2.0AD.
Kenney Manufacturing Company: *See*—
Cameron, John Kent, 4,012,961.
KERAG Kessel-,Apparate- und Anlagenbau Richterswil/Switzerland: *See*—
Zoller, Raimund, 4,013,220.
Kern, Otto Andrew, to General Motors Corporation. Vehicle body hood hinge. 4,012,807, Cl. 16-128.100.
Kessler, Lawrence W. Acoustic examination methods and apparatus. 4,012,951, Cl. 73-67.600.
Keystone Consolidated Industries: *See*—
Dauenbaugh, Robert L., 4,012,928.
Kiener, Volker: *See*—
Adolphi, Heinrich; Wunsch, Gerd; and Kiener, Volker, 4,013,740.
Kikkawa, Sueo: *See*—
Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, 4,014,031.
Kim, Chang J., to Exxon Research and Engineering Company. Novel catalyst and its use for steam hydroconversion and dealkylation processes. 4,013,734, Cl. 260-672.00R.
King, Donald J., to General Motors Corporation. Gas bearing roll shell assembly with preload means. 4,013,326, Cl. 308-9.000.
King, Jack B., to General Motors Corporation. Self-indicating thermostat. 4,013,218, Cl. 236-34.500.
King, John O., Jr. Reverse taper fastener system. 4,012,885, Cl. 403-408.000.
King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased (by Struewing, Barbara C., administratrix), to Legget & Platt Incorporated. Box spring assembly. 4,012,801, Cl. 5-247.000.
Kinnicutt, Roger, Jr.; and Hill, William J., to Morgan Construction Company. Coil inverter. 4,013,177, Cl. 214-1.00Q.
Kino, Yoshihiro; Furuya, Nobuaki; and Asanuma, Mitsuru, to Matsushita Electric Industrial Co., Ltd. Ghost signal erasing system. 4,013,834, Cl. 358-166.000.
Kirk, Norman W. Pendulum jack. 4,013,267, Cl. 254-85.000.
Kirkland, Robert E., to Raytheon Company. Beam former utilizing geometric sampling. 4,014,023, Cl. 343-100.0SA.
Kirschbaum, Herbert S., to Westinghouse Electric Corporation. Heating and cooling system with heat pump and storage. 4,012,920, Cl. 62-2.000.
Kirwan, Patrick William. Milking apparatus. 4,013,043, Cl. 119-14.090.
Kiselev, Sergei Viktorovich: *See*—
Diament, Elza Samuilovna; Kiselev, Sergei Viktorovich; Monin, Vladimir Leonidovich; Petrusinsky, Vyacheslav Vyacheslavovich; and Pronin, Vladimir Mikhailovich, 4,012,848.
Kishino, Shigeo; Kudamatsu, Akio; Takase, Iwao; Shiokawa, Kozo; and Yamaguchi, Shin-ichi, to Nihon Tokushu Noyaku Seizo Kabushiki Kaisha. Combating pests with O-ethyl-S-propyl-thionothiol or dithiophosphoric acid phenyl or naphthyl esters. 4,013,793, Cl. 424-210.000.
Kita, Toshiaki: *See*—
Harada, Tatsuo; Moriyama, Shigeo; Kita, Toshiaki; and Yamaguchi, Hidenori, 4,012,843.
Kitamura, Eiichi: *See*—
Kitamura, Ryoichi; Kitamura, Eiichi; Kitamura, Tetsuo; and Kitamura, Tameo, 4,013,639.

Kitamura, Ryoichi; Kitamura, Eiichi; Kitamura, Tetsuo; and Kitamura, Tameo, to Kitamura, Eiichi; Kitamura, Tetsuo; and Kitamura, Tameo. Preparation of asymmetric iminodibenzyl compounds. 4,013,639, Cl. 260-239.00D.

Kitamura, Tameo: *See*—
Kitamura, Ryoichi; Kitamura, Eiichi; Kitamura, Tetsuo; and Kitamura, Tameo, 4,013,639.

Kitamura, Tetsuo: *See*—
Kitamura, Ryoichi; Kitamura, Eiichi; Kitamura, Tetsuo; and Kitamura, Tameo, 4,013,639.

Kitani, Teruo: *See*—
Nagata, Takashi; Nakajima, Yasuo; and Kitani, Teruo, 4,013,970.

Kittendorf, Max: *See*—
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.

Kjellman, Samuel T.: *See*—
Brass, Robert L.; Venditti, Arthur P.; and Kjellman, Samuel T., 4,013,291.

Klaiber, Robert James, to Western Electric Company, Inc. Method of preparing a circuit utilizing a liquid crystal artwork master. 4,013,466, Cl. 96-36.000.

Klassen, Heinrich: *See*—
Dornbluth, Jurgen R. K.; Engel, Gerd; and Klassen, Heinrich, 4,012,818.

Klaubert, Dieter H.: *See*—
Sellstedt, John H.; and Klaubert, Dieter H., 4,013,647.

Kleeberg, Ulrich; and Leimkuhler, Jurgen, to Gottfried Bischoff Bau kompl. Method of and apparatus for treating a nonferrous metal. 4,013,455, Cl. 75-68.00R.

Klein, Alfons: *See*—
Willems, Jozef Frans; Poot, Albert Lucien; Van Besauw, Jan Frans; Klein, Alfons; and Wedemeyer, Karlfried, 4,013,473.

Klein, Eric; and Goodman, Ronald Burton, to Foster Wheeler Energy Corporation. Fired heater for a multiphase feedstock. 4,013,402, Cl. 432-223.000.

Klein, Willi; Rocholl, Henning; and Naydowski, Reinhard, to Bergische Stahl-Industrie. Device for controlling the return of a central coupling for rail vehicles to its central position. 4,013,175, Cl. 213-20.000.

Kleiner, Hans-Jerg: *See*—
Finke, Manfred; and Kleiner, Hans-Jerg, 4,013,715.

Klippert, Hans Ulrich, to Original Hanau Quarzlampen GmbH. Testing apparatus for light- and weather-resisting properties. 4,012,954, Cl. 73-150.00R.

Klockner-Werke AG: *See*—
Wehner, Karl Heinz, 4,012,914.

Kloek, James A.: *See*—
Alt, Gerhard H.; and Kloek, James A., 4,013,448.

Klossman, Charles W.: *See*—
Willitts, Benjamin R.; and Klossman, Charles W., 4,012,921.

Klykon, Inc.: *See*—
Finger, Richard H., 4,013,432.

Knell, Martin, to Ciba-Geigy Corporation. Substituted sulfonamide derivatives of hindered phenols and stabilized compositions. 4,013,621, Cl. 260-45.90R.

Knifton, John F., to Texaco Inc. Processes for regenerating dispersions of ligand stabilized, palladium and platinum (II) halide-complexes used in carbonylation and hydroformylation catalysts. 4,013,583, Cl. 252-415.000.

Knifton, John F., to Texaco Inc. Processes for regenerating dispersions of ligand-stabilized, palladium and platinum (II) halide complexes used in carbonylation and hydroformylation catalysis. 4,013,584, Cl. 252-415.000.

Knight, Frederick W., to United States of America, Army. Mechanical fly-away latching mechanism. 4,012,988, Cl. 89-1.806.

Knipp, Ulrich: *See*—
Boden, Heinrich; and Knipp, Ulrich, 4,013,391.

Knippenberg, Wilhelmus Franciscus; and Verspui, Gerrit, to North American Philips Corporation. Filamentary silicon carbide crystals by VLS growth in molten iron. 4,013,503, Cl. 156-609.000.

Knoll A.G. Chemische Fabriken: *See*—
Westermann, Albert; Zimmermann, Frank; Wuppermann, Dirk; Friedrich, Ludwig; and Raschack, Manfred, 4,013,663.

Knoll, Elmer P.: *See*—
Koput, James J.; and Knoll, Elmer P., 4,013,500.

Knorr-Bremse GmbH: *See*—
Gebhardt, Hans; and Prahl, Franz, 4,013,146.

Ko, Wen-Chuang; and Sawatzky, Erich, to International Business Machines Corporation. Method for varying the diameter of a beam of charged particles. 4,013,891, Cl. 250-492.00A.

Kobbeman, Donald D.: *See*—
Blasche, Thomas L., Jr.; Kobbeman, Donald D.; and Corley, Boyce M., 4,013,743.

Kobelt, Jacob. Internally liquid cooled disc brake. 4,013,148, Cl. 188-264.00D.

Kobler, Robert James, to AMP Incorporated. Electrical housing member. 4,013,331, Cl. 339-59.00R.

Kochey, Edward L., Jr.; and Hatch, Edward A., to Air Preheater Company, Inc., The. Slotted band type spacer for high temperature superheater tubes. 4,013,024, Cl. 110-98.00R.

Kodama, Koshiro: *See*—
Takematsu, Tetsuo; Konnai, Makoto; Isogawa, Takayuki; and Kodama, Koshiro, 4,013,449.

Kogelnik, Herwig Werner, to Bell Telephone Laboratories, Incorporated. Optical crossbar switching network. 4,013,000, Cl. 350-96.00C.

Kogyo Kaihatus Kenkyusho (Industrial Research Institute): *See*—
Tamura, Takaaki, 4,013,588.

Kohn, Gustave K.: *See*—
Brown, Melancthon S., deceased; and Kohn, Gustave K., 4,013,774.

Kohn, Gustave K., special administrator: *See*—
Brown, Melancthon S., deceased; and Kohn, Gustave K., 4,013,774.

Koike, Fuji. Cam carriage in dual-bed hand knitting machine. 4,012,926, Cl. 66-63.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Shintani, Sotokichi; Tamori, Michitoshi; and Nagai, Nobuo, 4,013,981.

Kokusan Kinzoku Kogyo Kabushiki Kaisha: *See*—
Harunari, Kouichi, 4,012,931.

Kolenik, Steve A., to ARCO Medical Products Company. Pediatric cardiac pacer system. 4,013,081, Cl. 128-419.00P.

Komata, Yasushi: *See*—
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, 4,013,800.

Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, to Canon Kabushiki Kaisha. Apparatus for separating transfer material in an electrostatic copying device. 4,013,354, Cl. 355-3.00R.

Kompfner, Rudolf; Chodorow, Marvin; and Lemons, Ross A., to Leland Stanford University, The Board of Trustees of the. Method of and apparatus for acoustic imaging. 4,012,950, Cl. 73-67.50R.

Konazewski, William Peter: *See*—
Copeland, Melvin; and Konazewski, William Peter, 4,013,065.

Kondo, Sigeru: *See*—
Tamura, Tooru; Ojima, Nobuyuki; Kondo, Sigeru; and Yozo, Jizodo, 4,013,612.

Konig, Dietor: *See*—
Steigerwald, Karl Heinz; Konig, Dietor; Scheffels, Wilhelm; and Glieneck, Klaus, 4,013,261.

Konnai, Makoto: *See*—
Takematsu, Tetsuo; Konnai, Makoto; Isogawa, Takayuki; and Kodama, Koshiro, 4,013,449.

Konno, Mitinobu: *See*—
Masaki, Kenji; Nagaishi, Hatuo; Konno, Mitinobu; and Ookubo, Yoshio, 4,012,905.

Kopeika, Saul Z. Balloon signal assembly. 4,013,035, Cl. 116-124.00B.

Kopetzki, Nikolaus; and Mykolenko, Petro, to General Motors Corporation. Multi-start involute regenerator matrix disk and method of assembling same. 4,013,117, Cl. 165-10.000.

Koput, James J.; and Knoll, Elmer P. Apparatus for wrapping elongated articles. 4,013,500, Cl. 156-425.000.

Kornhaas, Wolfgang, to E.M.V. Elektro-Mechanische Versuchsanstalt. Apparatus for automatic track registration. 4,014,040, Cl. 360-73.000.

Kortenoeven, Johannes: *See*—
de Putter, Jan A.; and Kortenoeven, Johannes, 4,013,783.

Korzekwa, Samuel M.: *See*—
Hesler, Joseph P.; and Korzekwa, Samuel M., 4,013,936.

Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, to Nippon Kokan Kabushiki Kaisha. Method of multiple gas shielded arc welding. 4,013,868, Cl. 219-137.0WM.

Koshino, Kenji: *See*—
Morino, Hideki; Tsuzuki, Isao; and Koshino, Kenji, 4,013,153.

Kostka, Antonin: *See*—
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,013,505.

Kostner, Armin: *See*—
Gerigk, Gunter; Bittner, Klaus-Jurgen; and Kostner, Armin, 4,013,099.

Kosugi, Yoshitsugu; Suzuki, Hideo; and Kamibayashi, Akira, to Agency of Industrial Science & Technology. Method for adsorption and elution of lipid hydrolyzing enzymes. 4,013,512, Cl. 195-66.00R.

Kotecki, Cezary: *See*—
Colecchi, Paul S.; and Kotecki, Cezary, 4,013,160.

Kraftwerk Union Aktiengesellschaft: *See*—
Weghaupt, Erich, 4,013,908.

Kramer, Wolfgang: *See*—
Stolzer, Claus; Kramer, Wolfgang; Buchel, Karl Heinz; and Meiser, Werner, 4,013,677.

Krause Milling Company: *See*—
Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., 4,013,629.

Krawczak, William G.; and Mularie, William M., to Minnesota Mining and Manufacturing Company. Piston loudspeaker. 4,013,846, Cl. 179-115.50R.

Kresse, Heinz; and Reichenberger, Helmut, to Siemens Aktiengesellschaft. Warning apparatus for indicating a threat of impending shock. 4,013,067, Cl. 128-2.05R.

Kreuter, Jacob, to Ecquacon Corporation. Sewage treatment process. 4,013,552, Cl. 210-12.000.

Kristoffersen, Bjorn R., to Boeing Company, The. Sitting-squatting water closet. 4,012,797, Cl. 4-10.000.

Krogstad, Reuben S.: *See*—
Vali, Victor; Shorthill, Richard W.; Goldstein, Raymond; and Krogstad, Reuben S., 4,013,365.

Kroll, Arthur S.: *See—*
Armstrong, Timothy G.; Kroll, Arthur S.; and Shuster, Frank A., 4,013,041.

Kronenberger, Paul E.; and Smith, Robert, to General Motors Corporation. Hydrator drawer cover with adjustable moisture control damper. 4,013,434, Cl. 62-382.000.

Krude, Werner, to Lohr & Bromkamp GmbH. Constant velocity universal joint and ball retainer cage therefor. 4,012,924, Cl. 64-21.000.

Krude, Werner, to Lohr & Bromkamp GmbH. Constant velocity torque transmitting joint. 4,012,925, Cl. 64-21.000.

Krueger, Robert K.: *See—*
Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., 4,013,629.

Kruesi, Paul R.: *See—*
Goens, Duane N.; and Kruesi, Paul R., 4,013,457.

Krutak, James J., Sr.: *See—*
Landholm, Richard A.; Haase, Jan R.; and Krutak, James J., Sr., 4,013,635.

Kubilius, Fabian; Pavlovic, Gary Frank; and Woolf, Jerome, to International Business Machines Corporation. Wet processing PH control. 4,013,039, Cl. 118-7.000.

Kudamatsu, Akio: *See—*
Kishino, Shigeo; Kudamatsu, Akio; Takase, Iwao; Shiokawa, Kozo; and Yamaguchi, Shin-ichi, 4,013,793.

Kuehnle, Manfred R., to Coulter Information Systems, Inc. Thin film deposition apparatus. 4,013,539, Cl. 204-298.000.

Kuerten, Heribert; Nagel, Otto; Sinn, Richard; Weinle, Werner; and Engler, Peter, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Process for the manufacture of fibrids of thermoplastics materials. 4,013,744, Cl. 264-11.000.

Kugelfischer Georg Schafer & Co.: *See—*
Lamprecht, Horst; and Welsch, Georg, 4,013,373.

Kuhnert, Gottfried, to Universal Maschinenfabrik Dr. Rudolf Schieber KG. Loop transferring cam system for flat knitting machines. 4,012,927, Cl. 66-78.000.

Kuhrt, Winfried: *See—*
Fischer, Hermann; Schindler, Hubert; Kuhrt, Winfried; and Weidenbach, Guenter, 4,013,587.

Kulczycki, Karol; and Darsie, Burns, to Barber-Colman Company. Triaxial weaving machine with heddle transfer and method. 4,013,103, Cl. 139-11.000.

Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, to SKF Industrial Trading and Development Company, B.V. Clutch thrust bearing. 4,013,327, Cl. 308-233.000.

Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Fuel consumption measuring device. 4,012,948, Cl. 73-113.000.

Kupchan, S. Morris; and Kameswaran, Venkataraman, to Research Corporation. Synthesis of hernandaline. 4,013,664, Cl. 260-288.00D.

Kurami, Kenshi: *See—*
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,013,306.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Nakamura, Kenichi; and Kakutani, Haruko, 4,013,531.

Kuroda, Nobuyuki: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,013,727.

Kurth, Carl Ferdinand: *See—*
Kao, Chih-Yu; and Kurth, Carl Ferdinand, 4,013,842.

Kurz, Reinhard. Regulator device for controlling the flow of a liquid. 4,013,095, Cl. 137-599.000.

Kuwada, Yutaka; Meguro, Kanji; Natsugari, Hideaki; Sato, Yoshiaki; and Tawada, Hiroyuki, to Takeda Chemical Industries, Ltd. Heterocyclic compounds. 4,013,763, Cl. 424-246.000.

L. Schuler GmbH: *See—*
Finsterwalder, Kurt; and Riedisser, Gunter, 4,013,003.
Schneider, Franz; and Schumann, Burkhard, 4,013,002.

Labofina S.A.: *See—*
Bracke, William J. I.; and Brandli, Jacqueline, 4,013,739.
Zavatti, Michele; Baravalle, Vittorio; and Saracino, Paolo, 4,013,603.

Labsley, Alain: *See—*
Granger, Rene; Labsley, Alain; and Rolland, Serge, 4,013,591.

Lace, Melvin Arthur, to Motorola, Inc. Ignition system for a multifueled engine. 4,013,050, Cl. 123-117.00R.

Lacefield, William B., to Eli Lilly and Company. 5,6-diaryl-1,2,4-triazines. 4,013,654, Cl. 260-248.0AS.

Lacy, James H., to Lacy's Metal Products, Inc. Trailer for lifting and transporting a container. 4,013,184, Cl. 214-505.000.

Lacy's Metal Products, Inc.: *See—*
Lacy, James H., 4,013,184.

Lafon, Victor, to Societe Anonyme dite: Laboratoire L. Lafon. Phenylsulphinyl-amidine derivatives. 4,013,776, Cl. 424-315.000.

Lahmer, Jurgen: *See—*
Dornaus, Johannes; Lahmer, Jurgen; and Refflinghaus, Bernd, 4,013,956.

Lainchbury, David Lindsay Guy; and Preedy, John Edward, to British Petroleum Company Limited, The. Growth of plants. 4,012,867, Cl. 47-17.000.

Laird, Gary W. Solar heat absorber. 4,013,062, Cl. 126-271.000.

Laky, Elmer; and Walsh, Ralph, to Breeze Corporations, Inc. Combined winch and boom assembly. 4,013,270, Cl. 254-173.00R.

Lalak, Marcel: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,013,505.

Lalk, James W.: *See—*
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.

LaLone, Barry Grant. High speed punching apparatus and tool therefor. 4,012,975, Cl. 83-140.000.

Lalos, Peter N.: *See—*
Pratt, Samuel S.; and Lalos, Peter N., 4,013,182.

Lamprecht, Horst; and Welsch, Georg, to Kugelfischer Georg Schafer & Co. Snap-ring-connected coaxial annular members. 4,013,373, Cl. 403-291.000.

Landholm, Richard A.; Haase, Jan R.; and Krutak, James J., Sr., to Eastman Kodak Company. Cyan azo dye-providing compounds. 4,013,635, Cl. 260-199.000.

Landholm, Richard A.: *See—*
Haase, Jan R.; Eldredge, Carl H.; and Landholm, Richard A., 4,013,633.

Landon, John T., Jr., to Eastman Kodak Company. Warm image tone providing photographic element. 4,013,470, Cl. 96-95.000.

Lane, Ramon; and Taub, Howard Hyman, to International Business Machines Corporation. Staggered nozzle array. 4,014,029, Cl. 346-1.000.

Lang, Volker. Device for wetting and heating gases, preferably breathing gases in respirators. 4,013,742, Cl. 261-130.000.

Lang, Walter W.; Wafer, John A.; Bratkowski, Walter V.; and Bhate, Suresh K., to Westinghouse Electric Corporation. Circuit breaker with improved trip actuator and undervoltage release mechanism. 4,013,926, Cl. 361-115.000.

Lang, William H.: *See—*
Chang, Clarence D.; and Lang, William H., 4,013,732.

Lannert, Kent P., to Monsanto Company. Substituted bis-(dicarboxymethyl)-ethers. 4,013,714, Cl. 260-535.00P.

Lanz, Walter J. Miles per gallon computer system means. 4,012,949, Cl. 73-114.000.

Lapp, Ellsworth W. Cable tensioning device with improved loading and removal capability. 4,013,266, Cl. 254-69.000.

Lautenberger, William Jacob: *See—*
Froehlich, Helmut Hermann; and Lautenberger, William Jacob, 4,013,594.

Lauzier, Rene, to Angenieux-CLB S.A. Caliper brake for cycles and the like. 4,013,144, Cl. 188-24.000.

Lavallee, Francois A.; LeGrand, Donald G.; and Gaines, George L., Jr., to General Electric Company. Indicator dye. 4,013,414, Cl. 23-230.00R.

Lavin, Eugene Patrick: *See—*
DuBois, Robert Clark; Lavin, Eugene Patrick; and Miciukiewicz, Joseph F., 4,013,359.

Lawford, William H.: *See—*
Histed, John A.; Lawford, William H.; and McLeod, Murray J., 4,013,506.

Lawrence Peska Associates, Inc.: *See—*
Carignan, Eugene, 4,012,956.
Mumm, Frank D., 4,013,145.

Lay, Ralph B.; and Moore, Donald L., to Cosco, Inc. Tubing connection. 4,013,372, Cl. 403-237.000.

Lebailly, Jacques, to U.S. Philips Corporation. Electroluminescent diode having threshold effect. 4,013,918, Cl. 315-71.000.

LeBlanc Research Corporation: *See—*
LeBlanc, Robert Bruce; and Badger, James Henry, 4,013,813.

LeBlanc, Robert Bruce; and Badger, James Henry, to LeBlanc Research Corporation. Aminoalkylphosphonic acid ester-based textile fire retardants. 4,013,813, Cl. 428-272.000.

Lectron Products, Inc.: *See—*
Edmonston, William H., 4,013,741.

Leder, Lewis B. Photoreceptor fabrication utilizing AC ion plating. 4,013,463, Cl. 96-1.500.

Lederer, William H., to E-C Apparatus Corporation. Ion exchange chromatographic isoenzyme separation and isolation. 4,013,513, Cl. 195-66.00R.

Lee, Yuan Ho. Multiheaded radial type nut tapper. 4,012,803, Cl. 10-132.000.

Lee, Yuan Ho. Intermittent rotary mechanism. 4,012,964, Cl. 74-435.000.

Leesona Corporation: *See—*
Perrino, Thomas William, 4,013,237.

Legget & Platt Incorporated: *See—*
King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,012,801.

LeGrand, Donald G.: *See—*
Lavallee, Francois A.; LeGrand, Donald G.; and Gaines, George L., Jr., 4,013,414.

LeHaye, Paul G.: *See—*
Craig, Glenn D.; Feuling, David T.; and LeHaye, Paul G., 4,013,399.

Lehmann, Andre: *See—*
Jucker, Erich; Greiner, Yvan; and Lehmann, Andre, 4,012,941.

Leibowitz, Marshall, to Timex Corporation. Electrochromic display element and process. 4,012,831, Cl. 29-570.000.

Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., to Procter & Gamble Company, The. Carrier granule for an organosilane. 4,013,573, Cl. 252-89.00R.

Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and

Watt, David M., Jr., to Procter & Gamble Company, The. Organosilane-containing prill. 4,013,574, Cl. 252-89.00R.
Leimkuhler, Jurgen: *See*—
Kleeberg, Ulrich; and Leimkuhler, Jurgen, 4,013,455.
Leland Stanford University, The Board of Trustees of the: *See*—
Kompfner, Rudolf; Chodorow, Marvin; and Lemons, Ross A., 4,012,950.
Lemercier, Guy: *See*—
Aubert, Michel; and Lemercier, Guy, 4,012,879.
Lemmer, Harold G., to General Motors Corporation. Graphite and copper in hot forging liquid lubricant. 4,013,570, Cl. 252-30.000.
Lemons, Ross A.: *See*—
Kompfner, Rudolf; Chodorow, Marvin; and Lemons, Ross A., 4,012,950.
Lemos, Walter G., to Textron, Inc. Adjustable outward clinch anvil assembly. 4,013,206, Cl. 227-83.000.
Lenz, George R., to G. D. Searle & Co. [8 α(E), 13aβ]-5,8,13,13a-tetrahydro-2,3,10,11-tetramethoxy-8-(2-phenylethenyl)-6H-dibenzo[a,g]quinolizines and intermediates thereto. 4,013,644, Cl. 260-240.00D.
Lenz, George R., to G. D. Searle & Co. (8α,13aβ)-8-carbocyclic/carbocyclic methyl-5,8,13,13a-tetrahydro-2,3,10,11-tetramethoxy-6H-dibenzo[a,g]quinolizines and intermediates thereto. 4,013,666, Cl. 260-289.00C.
Lenz, Hans: *See*—
Muschelknautz, Edgar; Lenz, Hans; and Herold, Heiko, 4,012,895.
Reinehr, Ulrich; Lenz, Hans; Nogaj, Alfred; and Blankenstein, Gunter, 4,013,406.
LeRow, Charles E., Jr.: *See*—
Alverson, Thomas E.; Soles, Otto H.; Hopkins, Melvyn D.; and LeRow, Charles E., Jr., 4,013,853.
Leroy, Jean-Marie Louis: *See*—
Stiot, Jean-Pierre Henri; Leroy, Jean-Marie Louis; and Brouard, Claude Marie Henri Emile, 4,013,632.
Leskovec, John, Jr. Means for incorporating multiple first days of issue stamps. 4,012,857, Cl. 40-2.00B.
Leugering, Hans Joachim: *See*—
Gordon, Wolfgang; Leugering, Hans Joachim; and Schaefer, Horst, 4,013,617.
Leuridan, Joel: *See*—
Weiler, Raoul; Leuridan, Joel; and Renier, Jozef, 4,013,755.
LeVasseur, Arnold P., to Possis Corporation. Method of and apparatus for automatic production of armatures. 4,012,834, Cl. 29-597.000.
Lever Brothers Company: *See*—
Child, Terence Frederick; and Davies, James Francis, 4,013,578.
Gutierrez, Eddie N.; and Reardon, Robert C., Jr., 4,013,722.
Levin, Yehuda: *See*—
Goldstein, Leon; Katzir (Katchalski), Ephraim; Levin, Yehuda; and Blumberg, Shmaryahu, 4,013,511.
Lewis, John R., to Harnessed Energies, Inc. Means for determining a first magnetic field direction by measuring secondary magnetic fields induced in a body rotated in said first field. 4,013,946, Cl. 324-43.00R.
Liang, Shen Fu; and Zeleny, Richard Alan, to Stauffer Chemical Company. Process for the manufacture of N(mercaptomethyl) phthalimide S-(O,O-dimethyl phosphorodithioate. 4,013,685, Cl. 260-326.00E.
Liautaud, John R. Portable emergency eye wash fountain. 4,012,798, Cl. 4-166.000.
Libbey-Owens-Ford Company: *See*—
Gladieux, Norman K.; and Miller, James W., 4,013,438.
Hansen, Ralph C.; and Miles, Ray P., 4,013,018.
Lieberman, Lester; and Oddo, Ralph, to Jan Hardware Manufacturing, Inc. Knob and control shaft assembly with brake. 4,012,966, Cl. 74-553.000.
Liebowitz, Marvin; and Brandli, Eugene Howard, to Colgate-Palmolive Company. Polish. 4,013,475, Cl. 106-10.000.
Liechti, Hans Wilhelm; and Defago, Raymond, to Ciba-Geigy Corporation. Exhaust process for the dyeing of synthetic organic textile materials in navy blue to black shades. 4,013,408, Cl. 8-26.000.
Light, William A., to Eastman Kodak Company. Photoconductive and radioconductive compositions and elements containing tetragonal lead monoxide. 4,013,464, Cl. 96-1.500.
Lin, Chiu-Hong, to Upjohn Company, The. 4,4,5,5-Tetradehydro-PGE, analogs. 4,013,695, Cl. 260-410.90R.
Lincoln Manufacturing Company, Inc.: *See*—
Kennedy, Robert J., Jr.; and Smith, Kendall S., II, 4,013,880.
Linde, James P.: *See*—
Smith, Jay A.; and Linde, James P., 4,013,216.
Lindemann, Hans-Joachim; and Wiest, Peter P. Medical dilator. 4,013,079, Cl. 128-341.000.
Lindner, Ernst: *See*—
Wissmann, Hans; Geiger, Rolf; Lindner, Ernst; and Scholkens, Bernward, 4,013,791.
Lindner, Robert G., to H. H. Robertson Company. Protective cap for underfloor access housing. 4,012,873, Cl. 52-99.000.
Lindner, Robert George: *See*—
Brogan, Darryl Keefer; Haskins, Paul Leon; and Lindner, Robert George, 4,012,874.
Lindo, Neil A.: *See*—
Zinnes, Harold; and Lindo, Neil A., 4,013,686.
Lindqvist, Bjorn Weine: *See*—
Johansson, Lennart Johan Ivar; Wallberg, Eric Vilhelm; and Lindqvist, Bjorn Weine, 4,012,859.
Lineberry, Cletus E.: *See*—
Milholen, William F.; and Lineberry, Cletus E., 4,013,183.
Liquichimica S.p.A.: *See*—
Zangrandi, Vittorio; and Peri, Paolo, 4,013,508.
Liss, Gote: *See*—
Hammarlund, Bertil; and Liss, Gote, 4,013,952.
Lister, D. Barry. Toy movie stick. 4,012,864, Cl. 46-47.000.
Litzell, John E.: *See*—
Cantley, George A.; and Litzell, John E., 4,013,034.
Liu, Hsing-Ching; and Liu, Lan-dih. Educational quiz and answer toy. 4,012,849, Cl. 35-9.00R.
Liu, Lan-dih: *See*—
Liu, Hsing-Ching; and Liu, Lan-dih, 4,012,849.
Loew, Gunther: *See*—
Jabs, Gert; and Loew, Gunther, 4,013,701.
Loffelman, Frank Fred: *See*—
Parent, Richard Alfred; and Loffelman, Frank Fred, 4,013,404.
Logan, Alan: *See*—
Moyle, Maurice; Galvez, Buenanventura B.; Pease, Eric C.; and Logan, Alan, 4,013,540.
Logan, Arthur D.; and Rush, James B., to Dayco Corporation. Hose construction. 4,013,101, Cl. 138-130.000.
Logie, Charles F., to American Store Equipment Corporation. Partition system. 4,012,880, Cl. 52-585.000.
Lohneis, Earl R.; and Schachte, John J., to Kearney & Trecker Corporation. Unitary work changer for a machining center. 4,013,176, Cl. 214-1.0BD.
Lohr & Bromkamp GmbH: *See*—
Krude, Werner, 4,012,924.
Krude, Werner, 4,012,925.
Lohse, Friedrich; Munk, Kurt; and Rembold, Heinz, to Ciba-Geigy Corporation. Polysiloxanes containing hydroxyl groups. 4,013,698, Cl. 260-448.80R.
Lohwasser, Hermann; Nagaj, Alfred; and Wieden, Horst, to Bayer Aktiengesellschaft. Process for the production of spontaneously crimping polyacrylonitrile composite fibres with improved crimp properties. 4,013,753, Cl. 264-168.000.
Lombana, Luis A.; and Campos, Jose G., to Envirotech Corporation. Incineration method and system. 4,013,023, Cl. 110-8.00A.
Long, Richard William. Diver's gas heater. 4,013,122, Cl. 165-154.000.
Long, William Gordon, to Babcock & Wilcox Company, The. Sandwich panel construction. 4,013,810, Cl. 428-308.000.
Longi, Paolo; Cameli, Nazzareno; Parodi, Sandro; and Cervi, Remo, to B. F. Goodrich Company, The. Process for preparing elastomeric copolymers of ethylene and higher alpha-olefins. 4,013,823, Cl. 526-166.000.
Longoria, Juan, III: *See*—
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.
Lori, John. Downrigger release. 4,012,863, Cl. 43-43.120.
Lorsch, Johannes. Apparatus for dispersing planar non-circular objects. 4,013,193, Cl. 221-264.000.
Loshaek, Samuel, to Wesley-Jessen Inc. Contact lens treating composition. 4,013,576, Cl. 252-106.000.
Louthan, Rector P.: *See*—
Williams, Ralph P.; and Louthan, Rector P., 4,013,571.
Love, Richard F.: *See*—
Kablaoui, Mahmoud S.; and Love, Richard F., 4,013,697.
Lovett, Jack R. Wireguide-transport apparatus. 4,013,269, Cl. 254-134.3PA.
Lowe, Edward James; and Ridgway, Frederick Arthur, to Hooker Chemicals & Plastics Corporation. Process for preparing phosphine. 4,013,756, Cl. 423-299.000.
Lucanera, Constantino: *See*—
Parker, Ernest G.; Lucanera, Constantino; and Craine, Richard W., 4,014,024.
Luke, George Michael: *See*—
Crenshaw, Ronnie Ray; Luke, George Michael; and Siminoff, Paul, 4,013,665.
Lundgren, Bengt, to SKF Nova A.B. Vibration damping coupling. 4,012,923, Cl. 64-11.00R.
Lunel, Jean: *See*—
Florent, Jean; Lunel, Jean; and Renaut, Jacques, 4,013,515.
Lupattelli, Carlo; and Miotti, Alfredo, to Societa Italiana Telecomunicazioni Siemens S.p.A. Marker for extending calls to remote junctions in a telecommunications system. 4,013,843, Cl. 179-18.0EB.
Lustgarten, David M.: *See*—
Brown, Richard E.; and Lustgarten, David M., 4,013,771.
Luthi, Christian: *See*—
Weber, Kurt; and Luthi, Christian, 4,013,713.
Lutze, Hans: *See*—
Reidelbach, Willi; Grach, Herbert; Lutze, Hans; and Weidemann, Dieter, 4,013,317.
Lutze, Siegfried: *See*—
Feichtinger, Hans; Birnkraut, Hans-Walter; Lutze, Siegfried; Payer, Wolfgang; and Schnier, Dieter, 4,013,822.
M.E.D.S. Corporation: *See*—
Ritota, Michael C.; and Mancini, L. Phillip, 4,013,077.
Ma, Tso-Ping; and Ma, William Hsioh-Lien, to International Business Machines Corporation. Process for eliminating undesirable charge centers in MIS devices. 4,013,485, Cl. 148-1.500.
Ma, William Hsioh-Lien: *See*—
Ma, Tso-Ping; and Ma, William Hsioh-Lien, 4,013,485.
Mabuchi, Kenichi, to Mabuchi Motor Co. Ltd. Battery powered motor assembly. 4,013,907, Cl. 310-50.000.

Mabuchi Motor Co. Ltd.: *See—*
Mabuchi, Kenichi, 4,013,907.
Machlan, George R.: *See—*
Kane, John L.; and Machlan, George R., 4,013,435.
Macias, Edward S.; and Husar, Rudolph B. Monitor for atmospheric pollutants. 4,013,888, Cl. 250-304.000.
MacMillan, Kenneth T. Retread mold including matrix biasing means. 4,013,389, Cl. 425-21.000.
Maeda, Naoyuki: *See—*
Kaji, Isamu, 4,013,940.
Magidson, Herbert; Huber, Otto L.; and Hennrich, Helmut, to Moldex/Metric, Inc. Method for making brassiere pad preforms. 4,013,750, Cl. 264-136.000.
Magna Mir, Inc.: *See—*
Portner, Robert; and Miller, Phillip, 4,013,353.
Magnagard Equipment Manufacturing Corporation: *See—*
Putnam, Dean H., 4,013,363.
Magnavox Company, The: *See—*
Spayth, Frank J., 4,013,958.
Magnusson, Arnold Ingemar. Multiple launcher. 4,012,985, Cl. 89-1.818.
Maguire, Edward J., Jr.: *See—*
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,573.
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,574.
Mailloux, Louis D., to Xerox Corporation. Notch filter for color transparency copying machines. 4,013,355, Cl. 355-4.000.
Maki, Takao; and Mineta, Kazuyuki, to Mitsubishi Chemical Industries Ltd. Process for the simultaneous manufacture of epsilon-caprolactones and carboxylic acids. 4,013,691, Cl. 260-343.000.
Makino, Shinichi, to Tokyo Shibaura Electric Co., Ltd. Hysteresis circuit. 4,013,898, Cl. 307-235.00F.
Malin, Stephen F.: *See—*
Shupack, Saul I.; and Malin, Stephen F., 4,013,411.
Malmberg, Quentin C.: *See—*
Wiggins, Edwin W.; and Malmberg, Quentin C., 4,013,190.
Malmros, Sten Axel Torby, to Volvo Flygmotor Aktiebolag. Axial bearing device for the cylinder barrel in an axial piston machine. 4,012,994, Cl. 91-499.000.
Mammino, Joseph: *See—*
Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., 4,013,462.
Mancini, L. Phillip: *See—*
Ritota, Michael C.; and Mancini, L. Phillip, 4,013,077.
Mandel, Alan F.; Frask, Theodore E.; and Bedel, Denis E., to Westinghouse Electric Corporation. Elevator system. 4,013,993, Cl. 340-19.00R.
Manitowoc Company, Inc., The: *See—*
Morrow, James G., Sr.; and Pech, David J., 4,013,174.
Mapatex Establishment: *See—*
Steiger, Ferdinand; and Wahlen, Werner, 4,013,107.
Marano, Ross T.: *See—*
Uram, Robert; Marano, Ross T.; Heiser, Richard S.; and Surh, Jeong Y., 4,013,877.
Marathon Oil Company: *See—*
Merrill, LaVaun S., Jr., 4,013,544.
Plummer, Mark A.; Schroeder, Donald E., Jr.; and Roszelle, Wayne O., 4,013,125.
Marc Wood S.A.: *See—*
Gewiss, Lucien Victor, 4,012,932.
Marci, Sebastian J.: *See—*
Clune, James P.; Aptt, Harry W.; and Marci, Sebastian J., 4,013,914.
Marconi Instruments Limited: *See—*
Colebourn, Graham Martin, 4,013,961.
Marforio, Nerino, to Rockwell-Rimoldi S.p.A. Fabric tensioning device for sewing and assembly units. 4,013,025, Cl. 112-121.150.
Margraff, Rodolphe: *See—*
Bouchaudon, Jean; Bourat, Guy; and Margraff, Rodolphe, 4,013,565.
Margvelashvili, Otar Vladimirovich: *See—*
Dvali, Rafael Rafaelovich; Margvelashvili, Otar Vladimirovich; Nozadze, Alexei Dmitrievich; Burdzgla, Mikhail Erastovich; and Melitauri, Alexandr Nikolaevich, 4,013,884.
Marion Laboratories, Inc.: *See—*
Spinner, Ernest Elliott; and Hounsell, Melvin Wayne, 4,013,422.
Marocco, Giuseppe, to Soberman Establishment. Method of sealing a porous block. 4,013,809, Cl. 427-296.000.
Marquardt Company, The: *See—*
Babbitt, Robert P., 4,013,428.
Marquardt, Eugene Everett: *See—*
Fox, Joel Lawrence; and Marquardt, Eugene Everett, 4,014,005.
Marsh, Dana G.; and Pochan, John M., to Xerox Corporation. Hybrid fix system incorporating photodegradable polymers. 4,013,572, Cl. 252-62.10P.
Martens, Henry J.; and Vandebult, Jan, to I. D. Engineering, Inc. Anti-theft fastening device and tool for releasing same. 4,012,813, Cl. 24-150.00R.
Martin, Barrie James, to Plessey Handel und Investments A.G. Fuel injection nozzle arrangement. 4,013,223, Cl. 239-102.000.
Martin, Elmore Louis, to Du Pont de Nemours, E. I., and Company. 2,5-Diisopropylterephthalonitrile. 4,013,704, Cl. 260-465.00H.
Martin, Johannes Josef. Rotary grate. 4,013,060, Cl. 126-163.00R.
Martin Marietta Corporation: *See—*
Friedell, Morley V., 4,013,264.
Martini, Thomas, to Hoechst Aktiengesellschaft. Perfluorinated vinyl ethers. 4,013,689, Cl. 260-340.600.
Martiradonna, Elio. Architectural modular elements for forming and/or completing monuments or like works of art. 4,012,881, Cl. 52-604.000.
Maruska, Gerald F., to Oscar Mayer & Co. Inc. Laminated anode. 4,013,811, Cl. 428-35.000.
Masaki, Kenji; Nagaishi, Hatuo; Konno, Mitinobu; and Ookubo, Yoshio, to Nissan Motor Co., Ltd. Exhaust cleaning system for internal combustion engine. 4,012,905, Cl. 60-286.000.
Masaki, Kenji; and Nambu, Shuya, to Nissan Motor Co., Ltd. Exhaust gas recirculation control device. 4,013,052, Cl. 123-119.00A.
Maschinenfabrik Augsburg-Nurnberg AG: *See—*
Hafner, Reinhard; Wojik, Karl; and Schlenker, Gerhard, 4,013,058.
Mason, Richard Storrs; Bible, Robert Edward; and Beach, James Robert, to Singer Company, The. Soldering mechanism for soldering electronic component leads to conductors on a printed circuit board, and the like. 4,013,208, Cl. 228-44.10A.
Massey-Ferguson Inc.: *See—*
Dowd, Allyn C.; and Rogowski, John D., 4,013,307.
Paul, David S., 4,013,308.
Massey-Ferguson Services N.V.: *See—*
Pensa, Carlo, 4,013,093.
Pensa, Carlo, 4,013,380.
Masuda, Kinji; Saigo, Hideaki; Naito, Kazuo; Utsunomiya, Tadashi; and Inoue, Sakae, to Bridgestone Tire Company Limited. Method for adhering a rubber composition to a metal material. 4,013,817, Cl. 428-462.000.
Matsubara, Masaki, to Olympus Optical Co., Ltd. Enlarging lens system. 4,013,346, Cl. 350-176.000.
Matsuda, Yoshindo: *See—*
Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, 4,013,585.
Matsuo, Masaki: *See—*
Nagoshi, Fumiya; Arakawa, Hideyuki; Uchino, Hayashi; Echigoya, Mitsuru; and Matsuo, Masaki, 4,013,608.
Matsuo, Yoshihiro: *See—*
Matsuoka, Tomizo; Matsuo, Yoshihiro; and Hayakawa, Shigeru, 4,013,592.
Matsuoka, Tomizo; Matsuo, Yoshihiro; and Hayakawa, Shigeru, to Matsushita Electric Industrial Co., Ltd. High temperature thermistor composition. 4,013,592, Cl. 252-521.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Dohi, Takashi; Ohara, Kenichi; and Gotoh, Iwao, 4,013,933.
Kino, Yoshihiro; Furuya, Nobuaki; and Asanuma, Mitsuru, 4,013,834.
Matsuoka, Tomizo; Matsuo, Yoshihiro; and Hayakawa, Shigeru, 4,013,592.
Nagata, Takashi; Nakajima, Yasuo; and Kitani, Teruo, 4,013,970.
Ohkubo, Tsuneo; and Horiike, Yoshio, 4,013,841.
Sato, Isao; and Kato, Makoto, 4,013,338.
Sugimoto, Yukio; Okamasa, Makoto; and Fukumura, Toyoshi, 4,013,845.
Tamura, Tooru; Ojima, Nobuyuki; Kondo, Sigeru; and Yozo, Jizodo, 4,013,612.
Yoshii, Tetsuji, 4,014,043.
Matsushita Electronics Corporation: *See—*
Hosokoshi, Kakuichiro; and Yoshida, Osamu, 4,013,467.
Matsushita, Sachio: *See—*
Idota, Yoshio; Iwano, Haruhiko; Shirasu, Kazuo; and Matsushita, Sachio, 4,013,527.
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawada, Yoshiyuki, to Sony Corporation. Semiconductor device. 4,014,037, Cl. 357-52.000.
Matsuura, Eiichi; and Tsukada, Nobuo, to Kabushiki Kaisha Daini Seikosha. Micro motor for a timepiece. 4,012,899, Cl. 58-23.00D.
Matsuzawa, Kunihiko, to Mitsubishi Jukogyo Kabushiki Kaisha. Device for supporting bulldozer blade. 4,013,132, Cl. 172-804.000.
Matuschek, Josip, to Textron, Inc. Blind rivet assembly with locking collar on rivet stem. 4,012,984, Cl. 85-70.000.
Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-alkyl-S-alkyl-O-phenyl phosphates and insecticidal and acaricidal method of use. 4,013,794, Cl. 424-212.000.
Maurer, Fritz: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,657.
Maxwell, Robert W., Jr. Process for separating 2,6-xylenol from a mixture of cresylic acids. 4,013,520, Cl. 203-34.000.
May, William Augustine: *See—*
Mitchell, Harry; and May, William Augustine, 4,012,800.
Mayer, Ingo. Magazine apparatus for run off spools. 4,013,243, Cl. 242-130.000.
Mazzaferro, Joseph. Molded plastic clamp. 4,012,811, Cl. 24-84.00H.
McBurnett, James R., to Tyrone Hydraulics, Inc. Emergency steering system. 4,013,138, Cl. 180-133.000.
McCarthy, Robert E.: *See—*
Sarinopoulos, George A.; McCarthy, Robert E.; and Waldrop, Joseph R., 4,013,928.
McCauley, Willard Mack. Lockable tire carrier. 4,013,203, Cl. 224-42.240.
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., to Andros, Incorporated. Gas analyzer. 4,013,260, Cl. 250-343.000.
McCoy, Daniel J., to General Electric Company. Power supply system

for providing uninterrupted output power. 4,013,938, Cl. 321-14.000.

McCoy, William D.: *See—*
Putney, Gordon A.; and McCoy, William D., 4,013,807.

McDonnell Douglas Corporation: *See—*
Douglas, Graham M., 4,013,832.
Wiggins, Edwin W.; and Malmberg, Quentin C., 4,013,190.

McDowell-Wellman Engineering Company: *See—*
Ban, Thomas E.; Hulette, Roger L.; and Mittra, Subir K., 4,013,517.

McElroy, David J., to Texas Instruments Incorporated. Direct drive display system for MOS integrated circuits using segment scanning. 4,014,013, Cl. 340-336.000.

McFadden, Russell T.: *See—*
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.

McGaffin, Andrew W. Detachable cutlery hook. 4,013,250, Cl. 248-37.300.

McGlynn, Daniel R. Vehicle operation control system. 4,013,875, Cl. 235-150.200.

McGregor, Eric Robert James. Present card. 4,012,858, Cl. 40-152.000.

McGuffey, Gale W.: *See—*
Benya, John A.; and McGuffey, Gale W., 4,013,944.

McIntyre, Gordon L.: *See—*
DeJuneas, James V.; McIntyre, Gordon L.; and O'Horo, James F., Jr., 4,013,622.

McLeod, Murray J.: *See—*
Histed, John A.; Lawford, William H.; and McLeod, Murray J., 4,013,506.

McMillan, William D.: *See—*
Hein, Allyn J.; McMillan, William D.; and Ruseff, Walter Z., 4,013,381.

McNally, Paul F.: *See—*
Jones, Donald H.; and McNally, Paul F., 4,014,014.

Mead Corporation, The: *See—*
Calvert, Rodney K.; and Scott, Dale K., 4,012,887.

Meguro, Kanji: *See—*
Kuwada, Yutaka; Meguro, Kanji; Natsugari, Hideaki; Sato, Yoshiaki; and Tawada, Hiroyuki, 4,013,763.

Meiers, Gerald Franklyn: *See—*
Soteropulos, Gust; and Meiers, Gerald Franklyn, 4,012,892.

Meir, James W.: *See—*
Dilgard, Michael H.; and Meir, James W., 4,013,049.

Meiser, Werner: *See—*
Stolzer, Claus; Kramer, Wolfgang; Buchel, Karl Heinz; and Meiser, Werner, 4,013,677.

Melitauri, Alexandr Nikolaevich: *See—*
Dvali, Rafael Rafaelovich; Margvelashvili, Otar Vladimirovich; Nozadze, Alexei Dmitrievich; Burdzgla, Mikhail Erastovich; and Melitauri, Alexandr Nikolaevich, 4,013,884.

Melvold, Robert W.: *See—*
Vrolyk, John J.; and Melvold, Robert W., 4,012,822.

Mercier, Charles A. Trash disposal apparatus. 4,013,215, Cl. 232-43.100.

Merkle, Hans Rupert; and Siegel, Hardo, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Preparation of 2,5-dimethylfuran-3-carboxylic amides. 4,013,684, Cl. 260-347.300.

Merrill, LaVaun S., Jr., to Marathon Oil Company. Method for making and slurrying wax beads. 4,013,544, Cl. 208-93.000.

Merz, Jurg; and Schibler, Luzius, to Ciba-Geigy Corporation. Production of alkoxylated N-methylol compounds. 4,013,655, Cl. 260-249.600.

Meserol, Peter M.: *See—*
Acker, Jesse L.; and Meserol, Peter M., 4,013,368.

Messer Griesheim GmbH: *See—*
Schmitt, Ewald, 4,013,277.

Metallgesellschaft Aktiengesellschaft: *See—*
Muhlberger, Horst; and Ruhle, Manfred, 4,013,425.

Methode Electronics, Inc.: *See—*
Brown, Vincent B., 4,013,849.

Meyer, Hans Rudolf, to Ciba-Geigy Corporation. Heterocyclic compounds containing sulpho groups. 4,013,642, Cl. 260-240.0CA.

Meyer, Helmut, to Jenaer Glaswerk Schott & Gen. Process for increasing resistance of glass products to cement and cementitious mixtures thereof. 4,013,478, Cl. 106-98.000.

Meyer, Martin H.; and Zakrzewski, Robert, to Outboard Marine Corporation. Auxiliary motor mounting assembly. 4,013,249, Cl. 248-4.000.

Meyer, Richard Neff: *See—*
Reichen, John Erwin; Meyer, Richard Neff; and Reed, Gary William, 4,013,855.

Michel, William E.: *See—*
Hosterman, Craig; Michel, William E.; and Oldham, Dale R., 4,013,860.

Miciukiewicz, Joseph F.: *See—*
DuBois, Robert Clark; Lavin, Eugene Patrick; and Miciukiewicz, Joseph F., 4,013,359.

Mickelson, Grant A., to Union Oil Company of California. Desulfurization of residual petroleum oils with a catalyst calcined at higher temperatures. 4,013,547, Cl. 208-216.000.

Micro Communications Corporation: *See—*
Beswick, Paul R.; Berton, Paul W.; Ganem, Charles F.; and Johnson, Clark E., Jr., 4,013,239.

Microlife Technics, Inc.: *See—*
Gryczka, Alfred J., 4,013,797.

Midwest Precision Corporation: *See—*
Crawford, Thomas A., 4,013,808.

Migliore-Samour, Daniele: *See—*
Jolles, Pierre; and Migliore-Samour, Daniele, 4,013,788.

Miklas, Frank C., to General Electric Company. Measuring dispenser. 4,013,198, Cl. 222-438.000.

Miko, Stephen John. Water jet cleaner for standpipes. 4,013,518, Cl. 202-241.000.

Mikulecky, Karel: *See—*
Burysek, Frantisek; Mikulecky, Karel; and Havranek, Zdenek, 4,013,242.

Miles, Ray P.: *See—*
Hansen, Ralph C.; and Miles, Ray P., 4,013,018.

Milholen, William F.; and Lineberry, Cletus E., to Forrest Paschal Machinery Co. Apparatus and method for stacking bricks in preparation for strapping. 4,013,183, Cl. 214-152.000.

Miller, Imrich M., to Universal Manufacturing Corporation. Soldering method. 4,013,212, Cl. 228-203.000.

Miller, James W.: *See—*
Gladieux, Norman K.; and Miller, James W., 4,013,438.

Miller, Phillip: *See—*
Portner, Robert; and Miller, Phillip, 4,013,353.

Miller, Robert C.: *See—*
Ryan, Frederick M.; and Miller, Robert C., 4,013,490.

Milner, William J. Fold-away tow bar. 4,013,303, Cl. 280-491.00D.

Milosevic, Romeo, to Tovarna motornih vozil TOMOS. Centrifugal clutch. 4,013,156, Cl. 192-105.0BA.

Minami, Takahisa: *See—*
Tsuji, Shozo; Minami, Takahisa; and Sumoto, Misao, 4,013,618.

Mineta, Kazuyuki: *See—*
Maki, Takao; and Mineta, Kazuyuki, 4,013,691.

Minnesota Mining and Manufacturing Company: *See—*
Fridinger, Tomas L., 4,013,444.
Krawczak, William G.; and Mularie, William M., 4,013,846.
Patterson, Richard A., 4,013,494.

Minolta Camera Kabushiki Kaisha: *See—*
Imura, Toshinori, 4,014,034.
Kawai, Yoshihisa, 4,013,358.
Nakamura, Akiyoshi, 4,013,347.

Miotti, Alfredo: *See—*
Lupattelli, Carlo; and Miotti, Alfredo, 4,013,843.

Mita Industrial Company, Ltd.: *See—*
Nakajima, Tadanobu; and Aizawa, Tatsuo, 4,013,357.

Mitchell, Harry; and May, William Augustine. Beds. 4,012,800, Cl. 5-187.000.

Mitchell, Neal L., to Chevron Research Company. Hydraulically actuated wire line apparatus. 4,013,123, Cl. 166-250.000.

Mitchell, Neal L.: *See—*
Hutchison, Stanley O.; and Mitchell, Neal L., 4,013,124.

Mitchell, Robert S.: *See—*
Dolan, Thomas J.; and Mitchell, Robert S., 4,013,586.

Mitsubishi Chemical Industries Ltd.: *See—*
Maki, Takao; and Mineta, Kazuyuki, 4,013,691.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Akiyoshi, oshio; and Shibuya, Hakushi, 4,013,895.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Yonemitsu, Eiichi; Igarashi, Takeo; Osaki, Naoto; Aoyama, Tetsuo; and Nakazato, Yukiya, 4,013,725.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Matsuzawa, Kunihiko, 4,013,132.

Mitsui Mining & Smelting Co., Ltd.: *See—*
Mukae, Satoshi, 4,013,412.

Mittra, Subir K.: *See—*
Ban, Thomas E.; Hulette, Roger L.; and Mittra, Subir K., 4,013,517.

Miyajima, Hideo: *See—*
Akachi, Hisateru; Miyajima, Hideo; and Yaguchi, Mitsuro, 4,012,894.

Miyamoto, Koichi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,013,354.

Mizukami, Takayoshi: *See—*
Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, 4,013,430.

Mizutani, Hiroshi: *See—*
Nakasone, Yumio; Abe, Miwako; and Mizutani, Hiroshi, 4,013,579.

Mobil Oil Corporation: *See—*
Chang, Clarence D.; and Lang, William H., 4,013,732.
Glass, John R., 4,013,872.

Moeller, Heinz J.; and Jagau, Heinz, to Continental Gummi-Werke Aktiengesellschaft. Vulcanizing mold for pneumatic vehicle tires. 4,013,390, Cl. 425-47.000.

Moldex/Metric, Inc.: *See—*
Magidson, Herbert; Huber, Otto L.; and Hennrich, Helmut, 4,013,750.

Moller, Hermann: *See—*
Andres, Rudolf; and Moller, Hermann, 4,013,883.

Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, to Bayer Aktiengesellschaft. Pigment formulation. 4,013,481, Cl. 106-309.000.

Monarch Marking Systems, Inc.: *See—*
Keefe, Jack D., 4,013,005.

Monin, Vladimir Leonidovich: *See—*
Diament, Elza Samuilovna; Kiselev, Sergei Viktorovich; Monin, Vladimir Leonidovich; Petrusinsky, Vyacheslav Vyacheslavovich; and Pronin, Vladimir Mikhailovich, 4,012,848.
Monroy, Jacob G. Self-blimped motion picture camera. 4,013,352, Cl. 352-35.000.
Monsanto Company: *See—*
Alt, Gerhard H.; and Kloek, James A., 4,013,448.
Brown, Raymond E., 4,013,916.
Corey, Albert E.; and Donermeyer, Donald D., 4,013,805.
D'Amico, John J., 4,013,638.
Dolan, Thomas J.; and Mitchell, Robert S., 4,013,586.
Fishel, Norman A., 4,013,694.
Lannert, Kent P., 4,013,714.
Olin, John F.; and Hamm, Philip C., 4,013,450.
Reilly, Joseph R., 4,013,164.
Sulzbach, Reinhard A.; and Iqbal, Abul F. M., 4,013,661.
Tyssee, Donald Armon, 4,013,524.
Wildi, Bernard S.; and Weeks, Lloyd E., 4,013,514.
Wolf, William D., 4,013,497.
Moore, Charles R. Transformer voltage regulator responsive to input variations. 4,013,941, Cl. 323-45.000.
Moore, Donald L.: *See—*
Lay, Ralph B.; and Moore, Donald L., 4,013,372.
Moore, Harry W., III, to Sperry Rand Corporation. System for editing characters. 4,014,017, Cl. 340-324.0AD.
Morelli, Claudio: *See—*
Rosa, Giovanni; Morelli, Claudio; Brando, Pasquale; and Daghetti, Giuseppe, 4,012,919.
Morgan, Barrie O.: *See—*
Branscome, Kenneth M.; Feath, William M.; Goode, George E.; Heizer, Kenneth W.; and Morgan, Barrie O., 4,013,837.
Morgan Construction Company: *See—*
Hill, William J., 4,013,256.
Kinnicutt, Roger, Jr.; and Hill, William J., 4,013,177.
Morgenstern, Dieter: *See—*
Ackermann, Otto; Bleh, Otto, deceased; and Morgenstern, Dieter, 4,013,656.
Mori, Kenji: *See—*
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.
Morino, Hideki; Tsuzuki, Isao; and Koshino, Kenji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Clutch hub for transmission. 4,013,153, Cl. 192-53.00F.
Moriyama, Shigeo: *See—*
Harada, Tatsuo; Moriyama, Shigeo; Kita, Toshiaki; and Yamaguchi, Hidenori, 4,012,843.
Morozowich, Walter, to Upjohn Company, The. Substituted phenyl esters of PGA_1. 4,013,693, Cl. 260-390.000.
Morozowich, Walter, to Upjohn Company, The. Substituted phenyl esters of PGA_1. 4,013,707, Cl. 260-471.00R.
Morris, Leeson R.: *See—*
Horning, Donald E.; Morris, Leeson R.; and Douglas, James L., 4,013,648.
Morris, Walter E. Method and apparatus for spray drying slurries and the like. 4,013,504, Cl. 159-4.000.
Morrison, Glenn C.; and Cetenko, Wiaczeslaw A., to Warner-Lambert Company. Method for reducing blood pressure. 4,013,778, Cl. 424-251.000.
Morrow, James G., Sr.; and Pech, David J., to Manitowoc Company, Inc., The. Swing drive with automatic shut-down control. 4,013,174, Cl. 212-68.000.
Moscarini, Filippo, to I.S.A.M. Istituto Sperimentale Auto e Motori S.p.A. Device for metering by weight the delivery of liquids. 4,013,194, Cl. 222-23.000.
Mosimann, David. Device for fixing a dental drill into a rotor. 4,012,841, Cl. 32-27.000.
Moss, Herbert Irwin: *See—*
Pinch, Harry Louis; and Moss, Herbert Irwin, 4,013,830.
Mosse, Alfred Lvovich: *See—*
Burov, Igor Sergeevich; Bysjuk, Vladimir Vladimirovich; Mosse, Alfred Lvovich; Shkurko, Leonid Stepanovich; and Vashkevich, Vyacheslav Andreevich, 4,013,415.
Motch & Merryweather Machinery Company, The: *See—*
Nowak, Robert H., 4,012,820.
Motorola, Inc.: *See—*
Beseke, Kermit Myles; Ramsland, David Gordon; and Stedman, Robert Bruce, 4,013,962.
Lace, Melvin Arthur, 4,013,050.
Skutta, Frank Robert, 4,013,964.
Tice, Lee Don; and Drury, David Michael, 4,013,925.
Mottet, Claude Henri: *See—*
de Fligue, Wladimir; and Mottet, Claude Henri, 4,013,931.
Mottry, Jean-Paul: *See—*
Claude, Pierre M. R.; Gencey, Robert E.; Mottry, Jean-Paul; and Cayre, Rene H., 4,013,009.
Mount Hope Machinery Company, Incorporated: *See—*
Feaster, Donavon L., 4,012,821.
Moyle, Maurice; Galvez, Buenanventura B.; Pease, Eric C.; and Logan, Alan, to Gulf Oil Canada Limited. Petroleum pitch preparation. 4,013,540, Cl. 208-4.000.
Muhlberger, Horst; and Ruhle, Manfred, to Metallgesellschaft Aktiengesellschaft. Thermometric bimetallic structure of high strength at high temperature. 4,013,425, Cl. 29-195.500.
Mukae, Satoshi, to Mitsui Mining & Smelting Co., Ltd. Method for judging purity of purified zinc sulphate solution used for electrolytic production of zinc. 4,013,412, Cl. 23-230.0PC.
Mukai, Tetsuro; and Mukai, Yoshiro. Binocular. 4,013,340, Cl. 350-36.000.
Mukai, Yoshiro: *See—*
Mukai, Tetsuro; and Mukai, Yoshiro, 4,013,340.
Mularie, William M.: *See—*
Krawczak, William G.; and Mularie, William M., 4,013,846.
Mulder, Rudolf: *See—*
Wellinga, Kobus; and Mulder, Rudolf, 4,013,717.
Muller, Ludwig. Device for securing a beam to sheet piling. 4,012,883, Cl. 52-729.000.
Multilam Corporation: *See—*
Hugin, Peter E., 4,013,329.
Mumm, Frank D., to Lawrence Peska Associates, Inc. Vehicle hill holder. 4,013,145, Cl. 188-32.000.
Mummenthey, Hans-Dieter: *See—*
Hultzsch, Kurt; Hesse, Wolfgang; and Mummenthey, Hans-Dieter, 4,013,605.
Munk, Kurt: *See—*
Lohse, Friedrich; Munk, Kurt; and Rembold, Heinz, 4,013,698.
Munsey, Robert J.: *See—*
Boundy, Bruce K.; and Munsey, Robert J., 4,013,254.
Murakami, Masuo; Kawada, Hiroitsu; Ohmura, Tadayoshi; and Sugiura, Hiroshi, to Yamanouchi Pharmaceutical Co., Ltd. Solid composition. 4,013,773, Cl. 424-284.000.
Murakami, Saburo, to Shimokawa, Wataru. Imparting oscillating motion. 4,013,028, Cl. 112-220.000.
Muramatsu, Shigeru: *See—*
Namiki, Ryoichi; and Muramatsu, Shigeru, 4,013,871.
Murphy, Herman H. Separators. 4,013,561, Cl. 210-222.000.
Muschelknautz, Edgar; Lenz, Hans; and Herold, Heiko, to Bayer Aktiengesellschaft. False-twisting arrangement for synthetic yarns. 4,012,895, Cl. 57-77.400.
Myers, Thomas S.: *See—*
Puderbaugh, George; Myers, Thomas S.; Pike, Robert W.; and Atley, Robert B., 4,013,076.
Mykolenko, Petro: *See—*
Kopetzki, Nikolaus; and Mykolenko, Petro, 4,013,117.
Naegeli, Peter, to Givaudan Corporation. Azulene compounds. 4,013,711, Cl. 260-488.00B.
Naegeli, Peter, to Givaudan Corporation. Azulene compounds. 4,013,726, Cl. 260-611.00F.
Nagahama, Yasuo, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument provided with a waveform converter for changing a sawtooth wave tone signal into a rectangular wave tone signal. 4,012,981, Cl. 84-1.010.
Nagai, Nobuo, to Nintendo Co., Ltd. Card magic box. 4,013,286, Cl. 272-8.00R.
Nagai, Nobuo: *See—*
Shintani, Sotokichi; Tamori, Michitoshi; and Nagai, Nobuo, 4,013,981.
Nagaishi, Hatuo: *See—*
Masaki, Kenji; Nagaishi, Hatuo; Konno, Mitinobu; and Ookubo, Yoshio, 4,012,905.
Nagaj, Alfred: *See—*
Lohwasser, Hermann; Nagaj, Alfred; and Wieden, Horst, 4,013,753.
Nagao, Kameji: *See—*
Horie, Ikutaro; and Nagao, Kameji, 4,013,472.
Nagao, Masami: *See—*
Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, 4,013,476.
Nagao, Yukio; and Shimada, Masayoshi, to Tokyo Shibaura Electric Co., Ltd. Apparatus for detecting irregularities in the surfaces of materials. 4,013,367, Cl. 356-200.000.
Nagase, Mitsuo, to Yoshida Kogyo Kabushiki Kaisha. Jointing device. 4,013,371, Cl. 403-187.000.
Nagata, Takashi; Nakajima, Yasuo; and Kitani, Teruo, to Matsushita Electric Industrial Co., Ltd. Frequency discriminating apparatus. 4,013,970, Cl. 329-117.000.
Nagel, Otto: *See—*
Kuerten, Heribert; Nagel, Otto; Sinn, Richard; Weinle, Werner; and Engler, Peter, 4,013,744.
Nagoshi, Fumiya; Arakawa, Hideyuki; Uchino, Hayashi; Echigoya, Mitsuru; and Matsuo, Masaki, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Method of producing polymer solutions of polymers or copolymers of vinyl chloride series. 4,013,608, Cl. 260-32.60N.
Nagy, Laszlo: *See—*
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.
Naito, Kazuo: *See—*
Masuda, Kinji; Saigo, Hideaki; Naito, Kazuo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,013,817.
Nakajima, Tadanobu; and Aizawa, Tatsuo, to Mita Industrial Company, Ltd. Copying machine in which, paper jamming at copying paper cutting mechanism is prevented. 4,013,357, Cl. 355-13.000.
Nakajima, Yasuo: *See—*
Nagata, Takashi; Nakajima, Yasuo; and Kitani, Teruo, 4,013,970.
Nakamura, Akiyoshi, to Minolta Camera Kabushiki Kaisha. Movable filter optical system for providing improved optical transmission characteristics. 4,013,347, Cl. 350-188.000.
Nakamura, Kenichi; and Kakutani, Haruko, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method of producing high molecular film containing ionized material. 4,013,531, Cl. 204-180.00R.

Nakano, Kiyokazu; Yamamoto, Hiroshi; and Ito, Yasunori, to Shimadzu Seisakusho Ltd. Baseline correction in densitometrical measurements. 4,013,364, Cl. 356-73.000.
Nakase, Takamichi: *See*—
Hattori, Tadashi; Nakase, Takamichi; Tsubouchi, Hideo; and Iwata, Toshiharu, 4,012,906.
Nakasone, Yumio; Abe, Miwako; and Mizutani, Hiroshi, to Kao Soap Co., Ltd. Acidic cleaning composition. 4,013,579, Cl. 252-143.000.
Nakazato, Yukiya: *See*—
Yonemitsu, Eiichi; Igarashi, Takeo; Osaki, Naoto; Aoyama, Tetsuo; and Nakazato, Yukiya, 4,013,725.
Nalco Chemical Company: *See*—
Ballweber, Edward G.; and Phillips, Kenneth G., 4,013,606.
Davis, William R., 4,013,555.
Nambu, Shuya: *See*—
Masaki, Kenji; and Nambu, Shuya, 4,013,052.
Namiki, Ryoichi; and Muramatsu, Shigeru, to Ricoh Co., Ltd. Image fixing roll for electrophotography. 4,013,871, Cl. 219-471.000.
Narodny, Leo H. Keyboard using optical switching. 4,013,342, Cl. 350-96.00C.
Nartron Corporation: *See*—
Bull, Dale L., 4,013,850.
Nashua Corporation: *See*—
Cheney, George T., 4,013,169.
National Forge Company: *See*—
Witkin, Donald E.; and Bowles, Arnold G., 4,013,394.
National Patent Development Corporation: *See*—
Vit, Jaroslav, 4,012,842.
National Research Development Corporation: *See*—
Askew, Barry Anthony; and Holland, Ronald, 4,013,818.
Broadway, Alexander Richard William; Fong, William; and Rawcliffe, Gordon Hindle, 4,013,909.
Broughton, Lewis, 4,013,232.
Eastham, John Frederick, 4,013,906.
Fox, Thomas Joseph; and Harry, John Ernest, 4,013,866.
Natsugari, Hideaki: *See*—
Kuwada, Yutaka; Meguro, Kanji; Natsugari, Hideaki; Sato, Yoshiaki; and Tawada, Hiroyuki, 4,013,763.
Naydowski, Reinhard: *See*—
Klein, Willi; Rocholl, Henning; and Naydowski, Reinhard, 4,013,175.
Neau, Alain: *See*—
Begey, Jean-Marie; and Neau, Alain, 4,013,304.
Nelson, Arthur L.; Skrabacz, Donald J.; and Young, Burbank, to CPC International Inc. Process for preparing a sugar tablet. 4,013,775, Cl. 426-285.000.
Nelson, Walter T., to American Chain & Cable Company, Inc. Accumulating roller conveyor. 4,013,161, Cl. 198-781.000.
Netto, Tito Livio Martins; and Barbetta, Ludgero Raul, to Acacia Engenharia Industria E Commercio. Modular housing units. 4,012,871, Cl. 52-79.400.
Neugart, Fernando M. Combustion apparatus. 4,013,397, Cl. 431-291.000.
New Products, Inc.: *See*—
ErkenBrack, Kenneth B., 4,013,207.
Ngu Tung, Pham: *See*—
Picquendar, Jean-Edgar; and Ngu Tung, Pham, 4,013,896.
Niagara Machine & Tool Works: *See*—
Jones, Clarence O., Jr., 4,013,152.
Nichols, Matthew, to Packaging Coordinators, Inc. Packaging apparatus for forming, filling and sealing receptacles. 4,012,888, Cl. 53-131.000.
Nicholson, Eric Samuel; and Ashworth, Brian Thomas, to Imperial Chemical Industries Limited. Amine condensate. 4,013,720, Cl. 260-570.5CA.
Nickell, Louis G.: *See*—
Karabinos, Joseph V.; and Nickell, Louis G., 4,013,681.
Nicolas, Michel: *See*—
Fournier, Jacques; and Nicolas, Michel, 4,014,021.
Nightingale, Douglas John, to Rolls-Royce (1971) Limited. Mounting bypass gas turbines engines on aircraft. 4,013,246, Cl. 244-54.000.
Nihon Kaiheiki Industrial Company, Ltd.: *See*—
Tanaka, Yukihisa, 4,013,857.
Nihon Tokushu Noyaku Seizo Kabushiki Kaisha: *See*—
Kishino, Shigeo; Kudamatsu, Akio; Takase, Iwao; Shiokawa, Kozo; and Yamaguchi, Shin-ichi, 4,013,793.
Nimco Corporation: *See*—
Bachner, George L.; and Bachner, Jerry G., 4,012,997.
Nintendo Co., Ltd.: *See*—
Nagai, Nobuo, 4,013,286.
Nippon Electric Company, Ltd.: *See*—
Horigome, Toshinori; Hamada, Sadanori; and Sato, Takami, 4,013,917.
Nishitoba, Shigeo; and Tokuda, Kazuo, 4,013,972.
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Nagahama, Yasuo, 4,012,981.
Suzuki, Tutomu, 4,012,980.
Nippon Kokan Kabushiki Kaisha: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, 4,013,868.
Nippon Soken, Inc.: *See*—
Hattori, Tadashi; Nakase, Takamichi; Tsubouchi, Hideo; and Iwata, Toshiharu, 4,012,906.
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,012,948.
Nippon Telegraph and Telephone Public Corporation: *See*—
Horikoshi, Yoshiji, 4,013,040.
Ishii, Yoshikazu; Hattori, Seizi; and Inagaki, Nobuo, 4,013,534.
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.
Nischik, Herbert; and von Sturm, Ferdinand, to Siemens Aktiengesellschaft. Method and apparatus for measuring the concentration of carbon monoxide. 4,013,522, Cl. 204-1.00T.
Nishitoba, Shigeo; and Tokuda, Kazuo, to Nippon Electric Company, Ltd. Amplifier with gain control means. 4,013,972, Cl. 330-29.000.
Niskanen, Erkki Pietari. 4-Way valve for separating of two liquid supply lines, especially in dairies and similar plants. 4,013,094, Cl. 137-597.000.
Nissan Motor Co., Ltd.: *See*—
Ezoe, Mitsuhiko; and Ozawa, Hiroshige, 4,013,951.
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,013,306.
Masaki, Kenji; Nagaishi, Hatuo; Konno, Mitinobu; and Ookubo, Yoshio, 4,012,905.
Masaki, Kenji; and Nambu, Shuya, 4,013,052.
Nisshin Flour Milling Co., Ltd.: *See*—
Asahina, Masako; Kato, Hideki; and Fukawa, Hideaki, 4,013,731.
Nogaj, Alfred: *See*—
Reinehr, Ulrich; Lenz, Hans; Nogaj, Alfred; and Blankenstein, Gunter, 4,013,406.
Nogle, Thomas Dushane, to Chrysler Corporation. Gas turbine burner. 4,012,904, Cl. 60-39.650.
Noguchi, Matsusaburo: *See*—
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, 4,013,004.
Nomiyama, Tetsuo. Impact-absorbing helmet. 4,012,794, Cl. 2-411.000.
Nonn, Konrad: *See*—
Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, 4,013,481.
Norio, Yamanashi: *See*—
Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, 4,013,001.
Norman, Robert J.: *See*—
Dinkelkamp, Henry T.; Carus, Bryce W.; and Norman, Robert J., 4,013,053.
North American Philips Corporation: *See*—
Clune, James P.; Aptt, Harry W.; and Marci, Sebastian J., 4,013,914.
Knippenberg, Wilhelmus Franciscus; and Verspui, Gerrit, 4,013,503.
Northup, John D., to Owens-Illinois, Inc. Method for forming glass bottles. 4,013,437, Cl. 65-76.000.
Nose, Yukihiko, to Takeda Chemical Industries, Ltd. Multipurpose metabolic assist system. 4,013,564, Cl. 210-434.000.
Notari, Bruno: *See*—
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, 4,013,589.
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, 4,013,590.
Nowak, Robert H., to Motch & Merryweather Machinery Company, The. Circular saw having teeth with an improved metal breaking geometry. 4,012,820, Cl. 29-103.00R.
Nozadze, Alexei Dmitrievich: *See*—
Dvali, Rafael Rafaelovich; Margvelashvili, Otar Vladimirovich; Nozadze, Alexei Dmitrievich; Burdzgla, Mikhail Erastovich; and Melitauri, Alexandr Nikolaevich, 4,013,884.
NRM Corporation: *See*—
Barton, Dale S.; Stoyanov, Ben; and Staats, Robert M., 4,013,186.
Nuzillat, Gerard; and Arnado, Christian, to Thomson-CSF. Method of adjusting the threshold voltage of field effect transistors. 4,013,483, Cl. 148-1.500.
N.V. Internationale Octrooi Maatschappij "Octropa": *See*—
Judge, Francis John; and Stubbs, Joseph Morriss, 4,012,845.
Nylund, Kenneth G. Ball mill. 4,013,233, Cl. 241-80.000.
Nysted, Leonard N., to G. D. Searle & Co. N,N-Disubstituted 2,3-diphenylallylamines. 4,013,643, Cl. 260-240.00K.
Obermeier, Rainer; and Geiger, Rolf, to Hoechst Aktiengesellschaft. Process for the preparation of insulin, analogs and derivatives thereof. 4,013,628, Cl. 260-112.700.
Oce-van der Grinten N.V.: *See*—
de Putter, Jan A.; and Kortenoeven, Johannes, 4,013,783.
O'Connor, Thomas J. Transversely and angularly adjustable tool holder EDM electrodes. 4,013,862, Cl. 219-69.00E.
Oddo, Ralph: *See*—
Lieberman, Lester; and Oddo, Ralph, 4,012,966.
O'Donoghue, Philip J. Portable thermal metal refining apparatus. 4,013,278, Cl. 266-213.000.
Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See*—
Philbert, Michel Eric, 4,013,366.
Ogawa, Ryota, to Asahi Kogaku Kogyo Kabushiki Kaisha. Large aperture superwide-angle lens. 4,013,350, Cl. 350-214.000.
Ogino, Katsuhiko: *See*—
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,013,509.
Oguchi, Munesuke: *See*—
Tanaka, Shigenobu; Yasuhara, Hikaru; and Oguchi, Munesuke, 4,013,948.
Ogura Jewel Industry Co., Ltd.: *See*—
Ogura, Junshiro, 4,012,897.

Ogura, Junshiro, to Ogura Jewel Industry Co., Ltd. Method and apparatus for twisting yarns. 4,012,897, Cl. 57-77.400.
Ohami, Kazuaki: *See*—
Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, 4,013,430.
Ohara, Kenichi: *See*—
Dohi, Takashi; Ohara, Kenichi; and Gotoh, Iwao, 4,013,933.
Ohashi, Koichi; Takahasi, Yuzi; and Suzuki, Takashi, to Tekkosha Co., Ltd. Electrostatic spray coating powder pigment composition and process for producing the same. 4,013,615, Cl. 260-42.530.
Ohkubo, Tsuneo; and Horiike, Yoshio, to Matsushita Electric Industrial Co., Ltd. Four-channel stereo receiver. 4,013,841, Cl. 179-15.0BT.
Ohmura, Tadayoshi: *See*—
Murakami, Masuo; Kawada, Hiroitsu; Ohmura, Tadayoshi; and Sugiura, Hiroshi, 4,013,773.
O'Horo, James F., Jr.: *See*—
DeJuneas, James V.; McIntyre, Gordon L.; and O'Horo, James F., Jr., 4,013,622.
Oikawa, Kunihiro, to Iwaki Co., Ltd. Magnetically driven centrifugal pump and means providing cooling fluid flow. 4,013,384, Cl. 417-368.000.
Ojima, Nobuyuki: *See*—
Tamura, Tooru; Ojima, Nobuyuki; Kondo, Sigeru; and Yozo, Jizodo, 4,013,612.
Okabe, Katsuhiko, to Copal Company Limited. Printer having a limited movement platen and/or printing head and independent supports therefor. 4,013,159, Cl. 197-1.00R.
Okamasa, Makoto: *See*—
Sugimoto, Yukio; Okamasa, Makoto; and Fukumura, Toyoshi, 4,013,845.
Okazaki, Hisayoshi: *See*—
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,013,509.
Oki Densen Kabushiki Kaisha: *See*—
Akachi, Hisateru; Miyajima, Hideo; and Yaguchi, Mitsuro, 4,012,894.
Oki Electric Industry Company, Ltd.: *See*—
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, 4,013,004.
Oldham, Dale R.: *See*—
Hosterman, Craig; Michel, William E.; and Oldham, Dale R., 4,013,860.
Oldham, William G., to Intel Corporation. Process for forming a low resistance interconnect in MOS N-channel silicon gate integrated circuit. 4,013,489, Cl. 148-174.000.
Olin Corporation: *See*—
Raghavan, Mathur, 4,013,459.
Ward, William J.; and Gasper, Kenneth E., 4,013,761.
Olin, John F.; and Hamm, Philip C., to Monsanto Company. Herbicidal ureido containing carbanilates. 4,013,450, Cl. 71-111.000.
Olinkraft, Inc.: *See*—
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,013,168.
Harris, Thomas Charles; and Hudson, Doyle Rayford, 4,012,886.
Olschewski, Armin: *See*—
Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, 4,013,327.
Olsen, Roger Fred, to Incom International Inc. Single lever control unit with throttle lever. 4,013,155, Cl. 192-.096.
Olson, Eldred, to Vi-Amino Feeds, Inc. Electric heating farrowing pad with means for overhead and side shielding of electric cord. 4,013,873, Cl. 219-541.000.
Olympus Optical Co., Ltd.: *See*—
Matsubara, Masaki, 4,013,346.
Ontario Tool Design Inc.: *See*—
Goverde, Ludovicus Jacobus, 4,013,288.
Ookubo, Yoshio: *See*—
Masaki, Kenji; Nagaishi, Hatuo; Konno, Mitinobu; and Ookubo, Yoshio, 4,012,905.
Ophaug, Darrell P.: *See*—
Dietz, Robert E.; Ophaug, Darrell P.; and Steve, Lynn B., 4,013,929.
Optipatent AG: *See*—
Hampel, Gerald, 4,013,747.
Original Hanau Quarzlampen GmbH: *See*—
Klippert, Hans Ulrich, 4,012,954.
Orlov, Vladislav Evgenievich: *See*—
Dvorov, Jury Ivanovich; and Orlov, Vladislav Evgenievich, 4,012,829.
Ormond, Alfred Newman. Short term creep compensation for load cells. 4,012,953, Cl. 73-141.00A.
Orsinger, Winston A.: *See*—
Tress, Norwood E.; and Orsinger, Winston A., 4,013,283.
Orthopedic Equipment Company, Inc.: *See*—
Harroff, Marlin R., 4,013,070.
Orto, Jozsef: *See*—
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.
Orts, Maria Amelia. Tortilla warmer and hydrater. 4,013,869, Cl. 219-401.000.
Osaki, Naoto: *See*—
Yonemitsu, Eiichi; Igarashi, Takeo; Osaki, Naoto; Aoyama, Tetsuo; and Nakazato, Yukiya, 4,013,725.
Osborg, Hans. Process for preparing hydrazines. 4,013,758, Cl. 423-407.000.
Oscar Mayer & Co. Inc.: *See*—
Maruska, Gerald F., 4,013,811.
Oswald, Lawrence J., to General Motors Corporation. Acoustically absorbent truck tire splash guard. 4,013,302, Cl. 280-154.50R.
Oszczakiewicz, Michael J.: *See*—
Thettu, Raghulinga R.; and Oszczakiewicz, Michael J., 4,013,400.
Otsuki, Akira: *See*—
Takeuchi, Mitsuharu; and Otsuki, Akira, 4,012,840.
Otteson, Kenneth M.: *See*—
Dawson, Daniel J.; Otteson, Kenneth M.; and Seitz, C. Thomas, 4,013,801.
Outboard Marine Corporation: *See*—
Meyer, Martin H.; and Zakrzewski, Robert, 4,013,249.
Ovutime, Inc.: *See*—
Schuster, Samuel R., 4,013,066.
Owen, Edward A., to Westinghouse Electric Corporation. Double induction air conditioning with fluidic control. 4,013,217, Cl. 236-13.000.
Owens-Corning Fiberglas Corporation: *See*—
Kane, John L.; and Machlan, George R., 4,013,435.
Owens-Illinois, Inc.: *See*—
Amberg, Stephen W., 4,013,496.
Hinson, David C., 4,013,912.
Northup, John D., 4,013,437.
Oxy Metal Industries Corporation: *See*—
Stevens, Peter; Deuber, John Martin; and Rosikiewicz, Kathleen Regina, 4,013,523.
Ozawa, Hiroshige: *See*—
Ezoe, Mitsuhiko; and Ozawa, Hiroshige, 4,013,951.
Ozretich, Thomas M., to Dow Chemical Company, The. Fungicidal methods employing substituted oxirane compounds. 4,013,772, Cl. 424-278.000.
Pabst, Horst: *See*—
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.
Pace, Gerald F.: *See*—
Stauter, John C.; and Pace, Gerald F., 4,013,754.
Pacheco, Edward R.: *See*—
Cone, John A.; Archer, Robert A.; Pacheco, Edward R.; and Peyton, Creath E., 4,014,028.
Packaging Coordinators, Inc.: *See*—
Nichols, Matthew, 4,012,888.
Packer, Herbert: *See*—
Swinehart, Carl F.; and Packer, Herbert, 4,013,796.
Pagani, Giorgia: *See*—
Guadalupi, Mario; Pagani, Giorgia; Zardi, Umberto; and Paris, Ivo, 4,013,718.
Pagel, Paul V., to Kaynar Mfg. Co., Inc. Prestressed connection and fastener therefor. 4,012,884, Cl. 403-408.000.
Paget, Hugh Patrick Dryhurst; Rogers, Leslie Richard; Royle, James Kenneth Davenport; Stansfield, James Frederick; and Topham, Arthur, to Imperial Chemical Industries Limited. Anthraquinone dispersing agents. 4,013,687, Cl. 260-376.000.
Panneman, Harm Jan, to Akzona Incorporated. N-hydroxy-amidine compounds. 4,013,682, Cl. 260-340.500.
Paquette, Kenneth N., to Shaw-Walker Company, The. Chair control. 4,013,257, Cl. 248-379.000.
Parcels, Ross M. Automotive crankcase emission control system. 4,013,051, Cl. 123-119.00B.
Parent, Richard Alfred; and Loffelman, Frank Fred, to American Cyanamid Company. Method of dyeing hair with indolines, indoles and indazoles. 4,013,404, Cl. 8-11.000.
Paris, Ivo: *See*—
Guadalupi, Mario; Pagani, Giorgia; Zardi, Umberto; and Paris, Ivo, 4,013,718.
Parker, Ernest G.; Lucanera, Constantino; and Craine, Richard W., to International Telephone and Telegraph Corporation. Non-rotating antenna. 4,014,024, Cl. 343-106.00R.
Parker-Hannifin Corporation: *See*—
Scott, Lynn S., 4,013,299.
Smrekar, Donald E.; Bilan, Peter; and Hamilton, James, 4,012,992.
Yoder, Paul D., 4,012,814.
Parodi, Sandro: *See*—
Longi, Paolo; Cameli, Nazzareno; Parodi, Sandro; and Cervi, Remo, 4,013,823.
Parry, Dwight L.: *See*—
Breneman, Richard; and Parry, Dwight L., 4,013,905.
Parsons, John Henry, to Fisons Limited. Ester-pyridinium compounds as acaricides. 4,013,669, Cl. 260-295.00R.
Parsons, Michael Edward: *See*—
Durant, Graham John; Ganellin, Charon Robin; and Parsons, Michael Edward, 4,013,659.
Passavant, Rudolf C.: *See*—
Weiler, Walter K. F.; and Passavant, Rudolf C., 4,013,374.
Passavant-Werke Michelbacher Hutte: *See*—
Weiler, Walter K. F.; and Passavant, Rudolf C., 4,013,374.
Passedouet, Andre Henri; and Pipon, Robert, to Rhone-Poulenc S.A. Aluminium and/or magnesium salts of amino-acids. 4,013,699, Cl. 260-448.00R.
Pataky, Gilbert A.: *See*—
Deem, Brian C.; Pataky, Gilbert A.; and Thompson, George W., 4,013,954.

Patel, Bhupendra C.; and Villari, Frank K., to Kendall Company, The. Port means for a liquid transport system. 4,013,064, Cl. 128-2.00F.

Patel, Mahesh S., to Eutectic Corporation. Flame spray powder for wear resistant alloy coating containing tungsten carbide. 4,013,453, Cl. 75-.50R.

Patentverwertungs-und Finanzierungsgesellschaft Serania AG: *See*—
Schmid, August, 4,013,886.

Patsey, John A., to United States Steel Corporation. Ultrasonic weld inspection system. 4,012,946, Cl. 73-67.700.

Patterson, Hubert A., to General Electric Company. Transmitter control apparatus. 4,013,959, Cl. 325-57.000.

Patterson, Richard A., to Minnesota Mining and Manufacturing Company. Tube forming method. 4,013,494, Cl. 156-86.000.

Paul Bergsoe & Son a/s: *See*—
Bergsoe, Svend, 4,013,456.

Paul, David S., to Massey-Ferguson Inc. Adjustable stabilizer. 4,013,308, Cl. 280-766.000.

Paull, Peter L.: *See*—
Suggitt, Robert M.; and Paull, Peter L., 4,013,546.

Pavilanis, Vytautas: *See*—
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Schrenk, Heinrich Maria, 4,013,770.

Pavlovic, Gary Frank: *See*—
Kubilius, Fabian; Pavlovic, Gary Frank; and Woolf, Jerome, 4,013,039.

Payer, Wolfgang: *See*—
Feichtinger, Hans; Birnkraut, Hans-Walter; Lutze, Siegfried; Payer, Wolfgang; and Schnier, Dieter, 4,013,822.

Payne, Robert L., to Honeywell Inc. Initial reset signal generator and low voltage detector. 4,013,902, Cl. 307-268.000.

PCB Piezotronics, Inc.: *See*—
Change, Nicholas D.; and Riggs, Michael T., 4,012,940.

Pease, Eric C.: *See*—
Moyle, Maurice; Galvez, Buenanventura B.; Pease, Eric C.; and Logan, Alan, 4,013,540.

Pech, David J.: *See*—
Morrow, James G., Sr.; and Pech, David J., 4,013,174.

Peddinghaus, Rolf: *See*—
Regenbrecht, Ludwig, 4,012,977.

Peil, William: *See*—
Hwang, Ying-Chen; Peil, William; and Zeigler, John F., III, 4,014,038.

Pelly, Brian R.; and Gyugyi, Laszlo, to Westinghouse Electric Corporation. Naturally commutated cycloconverter with controlled input displacement power factor. 4,013,937, Cl. 321-7.000.

Pendleton, Frank P., to VAC-U-MAX. Pneumatically actuated hopper-feeder apparatus. 4,013,321, Cl. 302-59.000.

Pensa, Carlo, to Massey-Ferguson Services N.V. Hydraulic valves. 4,013,093, Cl. 137-491.000.

Pensa, Carlo, to Massey-Ferguson Services N.V. Control systems for variable capacity hydraulic machines. 4,013,380, Cl. 417-218.000.

PEPRO, Societe pour le Developement et la Vente de Specialities Chimiques: *See*—
Abblard, Jean; and Poignant, Pierre, 4,013,716.

Peri, Paolo: *See*—
Zangrandi, Vittorio; and Peri, Paolo, 4,013,508.

Perrault, Frederick; and Perrault, Raymond E. Bracket support. 4,013,253, Cl. 248-223.300.

Perrault, Raymond E.: *See*—
Perrault, Frederick; and Perrault, Raymond E., 4,013,253.

Perrella, Guido. Die-casting machine. 4,013,116, Cl. 164-262.000.

Perrin, Jack Louis, to Towlsaver, Inc. Automatic dismounting roll for roll towel dispensers. 4,013,236, Cl. 242-1.000.

Perrin, Jack Louis, to Towlsaver, Inc. Roll supporting and automatic dismounting mechanism for roll towel dispensers and method of using. 4,013,240, Cl. 242-55.530.

Perrino, Thomas William, to Leesona Corporation. Winding apparatus with tailing device. 4,013,237, Cl. 242-18.0PW.

Perry, John R.: *See*—
Goreham, Kenneth A.; and Perry, John R., 4,013,746.

Peter Strong & Company, Inc.: *See*—
Hill, William H., 4,012,839.

Peters, Philip H., Jr., to Environment/One Corporation. Induction cooking unit having cooking load sensing device and essentially zero stand-by power loss. 4,013,859, Cl. 219-10.490.

Petersen, Ross K. Engine air intake system. 4,013,137, Cl. 180-69.00R.

Peterson, Fred M. Deep well pump system. 4,013,385, Cl. 417-377.000.

Peterson, Jack V.: *See*—
Chiles, William E.; Vetsch, LeRoy E.; and Peterson, Jack V., 4,012,957.

Petrighenko, Alexandr Alexandrovich: *See*—
Kalabukhova, Ljudmila Nikolaenva; Rudevskaya, Svetlana Ivanovna; Petrighenko, Alexandr Alexandrovich; and Smurova, Alberta Sergeevna, 4,013,248.

Petrik, Albert V. Swimming pool strainer construction. 4,013,563, Cl. 210-407.000.

Petro, John, to Westinghouse Electric Corporation. Safety switch which renders HID lamp inoperative on accidental breakage of outer envelope. 4,013,920, Cl. 315-73.000.

Petrow, Vladimir: *See*—
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,013,762.

Petrus, Francis X., to Pullman Incorporated. Support means for a roller hearth in a kiln. 4,013,403, Cl. 432-239.000.

Petrusinsky, Vyacheslav Vyacheslavovich: *See*—
Diament, Elza Samuilovna; Kiselev, Sergei Viktorovich; Monin, Vladimir Leonidovich; Petrusinsky, Vyacheslav Vyacheslavovich; and Pronin, Vladimir Mikhailovich, 4,012,848.

Pews, R. Garth; and Davis, Ralph A., to Dow Chemical Company, The. Process for making β-bromocitraconic anhydride. 4,013,683, Cl. 260-346.80R.

Peyton, Creath E.: *See*—
Cone, John A.; Archer, Robert A.; Pacheco, Edward R.; and Peyton, Creath E., 4,014,028.

Pfizer Inc.: *See*—
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 4,013,789.
Harbert, Charles A., 4,013,662.

Philagro S.A.: *See*—
Poignant, Pierre; Borrod, Guy; and Richard, Raymond, 4,013,451.

Philbert, Michel Eric, to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Method and apparatus for investigation of small displacements of a solid body by means of coherent light. 4,013,366, Cl. 356-106.00R.

Phillips, Kenneth G.: *See*—
Ballweber, Edward G.; and Phillips, Kenneth G., 4,013,606.

Phillips Petroleum Company: *See*—
Cheng, Paul J., 4,013,420.
Hatcher, Charles S., 4,012,816.
Schirmer, Robert M., 4,012,902.
Uraneck, Carl A.; and Burleigh, John E., 4,013,824.
Warner, Paul F., 4,013,724.
Williams, Ralph P.; and Louthan, Rector P., 4,013,571.

Photo-Me Limited: *See*—
Currie, John, 4,014,032.

Picardi, Giovanni: *See*—
Bucciarelli, Tullio; and Picardi, Giovanni, 4,013,998.

Picquendar, Jean-Edgar; and Ngu Tung, Pham, to Thomson-CSF. High-speed logic gate with two complementary transistors and saturable resistors. 4,013,896, Cl. 307-214.000.

Pierrel S.p.A.: *See*—
Riva, Mario; Toscano, Luciano; Grisanti, Giampiero; and Bianchetti, Alberto, 4,013,679.

Pike, Robert W.: *See*—
Puderbaugh, George; Myers, Thomas S.; Pike, Robert W.; and Atley, Robert B., 4,013,076.

Pilkington, Donald James: *See*—
Goffe, Frederick William Frank; and Pilkington, Donald James, 4,012,943.

Pillon, Austin E., to ITL Industries, Inc. Pill counter. 4,013,192, Cl. 221-7.000.

Pilolla, Joseph J.: *See*—
Snodgrass, James D.; and Pilolla, Joseph J., 4,013,557.

Pinch, Harry Louis; and Moss, Herbert Irwin, to RCA Corporation. Video disc stylus. 4,013,830, Cl. 358-128.000.

Piontek, Gunter; Firlay, Heinz; and Westheider, Heinz, to Deutsche Babcock & Wilcox Aktiengesellschaft. Device for the removal of bulk material from bulk material dumps. 4,013,180, Cl. 214-10.000.

Piper, James G. Portable footrest. 4,013,318, Cl. 297-438.000.

Pipon, Robert: *See*—
Passedouet, Andre Henri; and Pipon, Robert, 4,013,699.

Pitney-Bowes, Inc.: *See*—
DuBois, Robert Clark; Lavin, Eugene Patrick; and Miciukiewicz, Joseph F., 4,013,359.

Plakas, Chris J., to Vitatelt Corporation. Luminescent reaction testing. 4,013,418, Cl. 23-253.00R.

Plessey Handel und Investments A.G.: *See*—
Martin, Barrie James, 4,013,223.

Ploeger, Thomas L. Acoustical reflector for wind instruments. 4,012,983, Cl. 84-400.000.

Plummer, Mark A.; Schroeder, Donald E., Jr.; and Roszelle, Wayne O., to Marathon Oil Company. Flooding with micellar dispersions containing petroleum sulfonates obtained by sulfonating whole or topped crude oil. 4,013,125, Cl. 166-273.000.

Pluss-Staufer AG: *See*—
Delfosse, Pierre; and Bosshard, Alfred, 4,013,602.

Pocar, Donato: *See*—
Bianchetti, Giuseppe; Pocar, Donato; and Stradi, Riccardo, 4,013,441.

Pochan, John M.: *See*—
Marsh, Dana G.; and Pochan, John M., 4,013,572.

Podella, Carl Walter; and Reichley, Fred Jay, to S. C. Johnson & Son, Inc. Non-flammable rug cleaning composition. 4,013,595, Cl. 252-545.000.

Pohl, Siegfried: *See*—
Gernhardt, Paul; Pohl, Siegfried; Danguillier, Wilhelm; and Grams, Wolfgang, 4,013,427.

Poignant, Pierre; Borrod, Guy; and Richard, Raymond, to Philagro S.A. Herbicidal compositions for killing weeds in vineyards. 4,013,451, Cl. 71-116.000.

Poignant, Pierre: *See*—
Abblard, Jean; and Poignant, Pierre, 4,013,716.

Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, to AGFA-GEVAERT N.V. Development of photographic silver halide elements. 4,013,471, Cl. 96-66.300.

Pollitzer, Ernest L.; and Hayes, John C., to UOP Inc. Hydroprocessing of hydrocarbons. 4,013,548, Cl. 208-255.000.

Pollitzer, Ernest L.; and Hayes, John C., to UOP Inc. Hydrocarbon isomerization process. 4,013,738, Cl. 260-683.200.

Pollitzer, Ernest L.: *See—*
Antos, George J.; Hayes, John C.; and Pollitzer, Ernest L., 4,013,735.
Pollock, William Hunter, to Air Preheater Company, Inc., The. Twin furnace industrial boiler. 4,013,045, Cl. 122-240.00R.
Poma, Luis, to Interpile USA, Inc. Driving tips for forming cast-in-place caseless concrete piles. 4,012,915, Cl. 61-53.000.
Poot, Albert Lucien: *See—*
Willems, Jozef Frans; Poot, Albert Lucien; Van Besauw, Jan Frans; Klein, Alfons; and Wedemeyer, Karlfried, 4,013,473.
Pope, Toby K.: *See—*
Ballou, David G.; Bishop, Clinton L.; and Pope, Toby K., 4,012,962.
Popp, Gottfried. *See—*
Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, 4,013,481.
Porter, John Brian, to Russel Bowen Systems Ltd. Bending machines. 4,012,933, Cl. 72-217.000.
Porter, Stephen G.; and Adams, Theodore J. Weed guard for trolling motors. 4,013,033, Cl. 115-42.000.
Portescap: *See—*
Jucker, Erich; Greiner, Yvan; and Lehmann, Andre, 4,012,941.
Portner, Robert; and Miller, Phillip, to Magna Mir, Inc. Optical reflecting system. 4,013,353, Cl. 353-99.000.
Possis Corporation: *See—*
LeVasseur, Arnold P., 4,012,834.
Postl, Wolfgang: *See—*
Starck, Alexander; and Postl, Wolfgang, 4,013,827.
Postolaty, Vitaly Mikhailovich: *See—*
Boshnyaga, Valery Anatolievich; Kalinin, Lev Pavlovich; and Postolaty, Vitaly Mikhailovich, 4,013,942.
Potter, Glenn James. Fatigue reducing backpack harness. 4,013,201, Cl. 224-25.00A.
Powell, Joe Allen, to B. F. Goodrich Company, The. Pneumatic tire with reduced rate of inflation loss upon being punctured. 4,013,111, Cl. 152-347.000.
Powell, Stanley; and Thomas, Glyn, to Tioxide Group Limited. Process for the oxidation of a metal halidein the vapor phase. 4,013,782, Cl. 423-613.000.
Pozsonyi, Istvan: *See—*
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.
PPG Industries, Inc.: *See—*
Briar, Thomas J., 4,013,433.
Deli, Joseph; and Stevens, Henry C., 4,013,675.
Pradon, Jacques. Safety equipment. 4,013,140, Cl. 182-1.000.
Pradt, Louis A., to Sterling Drug Inc. Energy production of wet oxidation systems. 4,013,560, Cl. 210-152.000.
Prahl, Franz: *See—*
Gebhardt, Hans; and Prahl, Franz, 4,013,146.
Prain, Hunter Douglas: *See—*
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,013,769.
Pratesi, Riccardo: *See—*
Burlamacchi, Pio; Pratesi, Riccardo; and Vanni, Umberto, 4,013,978.
Pratt, Samuel S.; and Lalos, Peter N., to Rockland, Inc. Detachable coupling system. 4,013,182, Cl. 214-145.00A.
Preedy, John Edward: *See—*
Lainchbury, David Lindsay Guy; and Preedy, John Edward, 4,012,867.
Preissinger, Karl-Heinz; and Wehnelt, Ulrich, to Siemens Aktiengesellschaft. Method of making a capacitor. 4,012,817, Cl. 29-25.420.
Prezioso, Richard L. High security door lock. 4,013,311, Cl. 292-59.000.
Printon Australasia Pty. Limited: *See—*
Donenfeld, Henry, 4,013,405.
Procter & Gamble Company, The: *See—*
Huber, Arthur Elmer, 4,013,581.
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,573.
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,574.
Produits Chimiques Ugine Kuhlmann: *See—*
Stiot, Jean-Pierre Henri; Leroy, Jean-Marie Louis; and Brouard, Claude Marie Henri Emile, 4,013,632.
Pronin, Vladimir Mikhailovich: *See—*
Diament, Elza Samuilovna; Kiselev, Sergei Viktorovich; Monin, Vladimir Leonidovich; Petrusinsky, Vyacheslav Vyacheslavovich; and Pronin, Vladimir Mikhailovich, 4,012,848.
Puderbaugh, George; Myers, Thomas S.; Pike, Robert W.; and Atley, Robert B., to Diemolding Corporation. Aspirator jar. 4,013,076, Cl. 128-276.000.
Pullman Incorporated: *See—*
Petrus, Francis X., 4,013,403.
Puls, Walter: *See—*
Frommer, Werner; Puls, Walter; Schafer, Dietmar; and Schmidt, Delf, 4,013,510.
Pum, Franz J.: *See—*
Cella, John A.; Fiebig, August Emil, Jr.; and Pum, Franz J., 4,013,786.
Purzycki, Kenneth L.: *See—*
Shaffer, Gary W.; Tornell, Irene; and Purzycki, Kenneth L., 4,013,593.
Putnam, Dean H., to Magnagard Equipment Manufacturing Corporation. Vesicular film advancing module. 4,013,363, Cl. 355-97.000.
Putney, Gordon A.; and McCoy, William D., to Systemation Div. of Koerper Engineering Associates, Inc. Coating electronic components by means of fluidized bed. 4,013,807, Cl. 427-184.000.
Putz, Helmut: *See—*
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.
Pye, Stephen: *See—*
Fischer, Paul W.; Jones, Jerry C., deceased; Pyle, Delbert E.; and Pye, Stephen, 4,013,568.
Pyle, Delbert E.: *See—*
Fischer, Paul W.; Jones, Jerry C., deceased; Pyle, Delbert E.; and Pye, Stephen, 4,013,568.
Queen's University at Kingston: *See—*
Wolfe, Saul, 4,013,653.
Quentin, Karl-Ernst: *See—*
Reis, August; Quentin, Karl-Ernst; and Weil, Ludwig, 4,013,554.
Quick, William H. Repair kit for plastic pipe. 4,013,309, Cl. 285-31.000.
Quine, John P., to General Electric Co. Microstrip broadband avalanche diode amplifier. 4,013,974, Cl. 330-34.000.
Quinlan, John J.: *See—*
Granda, Jose E.; Quinlan, John J.; and Garland, James J., 4,013,597.
Quon, Donald S., to Wagner Electric Corporation. Fault detection for wheel slip control system. 4,013,324, Cl. 303-92.000.
Rabatin, Gyorgy: *See—*
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.
Raeger, Edgar Avinell: *See—*
Rager, Edgar Avinell; and Webber, Barry Bruce, 4,013,492.
Raffaele, Italo, to Biomedix A.G. Analyzer for the determination of hemoglobin and other related compounds in whole blood and hemoglobin solutions. 4,013,417, Cl. 23-253.00R.
Ragano, Anthony; and Barton, Steven A. Vehicle warning system. 4,013,994, Cl. 340-33.000.
Rager, Edgar Avinell; and Webber, Barry Bruce, to Raeger, Edgar Avinell. Method of simultaneously plating dissimilar metals. 4,013,492, Cl. 156-632.000.
Raghavan, Mathur, to Olin Corporation. Oxidation resistant nickel base alloys. 4,013,459, Cl. 75-171.000.
Ragoonanan, Dulcie; and Harris, Brian W., to Texaco Trinidad, Inc. Process for making alkane-1,2-diol diesters. 4,013,712, Cl. 260-497.00R.
Rajagopalan, Parthasarathi, to Endo Laboratories, Inc. Pyridopyrrolobenzoxazine. 4,013,652, Cl. 260-244.00R.
Raleigh Industries Limited: *See—*
Hillyer, Anthony William, 4,013,151.
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, to Rederiaktiebolaget Nordstjernan. Nickel and/or cobalt-coated steel with carburized interface. 4,013,487, Cl. 148-16.500.
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, to Rederiaktiebolaget Nordstjernan. Process for improving the anti-corrosion properties of steel coated with nickel or cobalt. 4,013,488, Cl. 148-143.000.
Ramsland, David Gordon: *See—*
Beseke, Kermit Myles; Ramsland, David Gordon; and Stedman, Robert Bruce, 4,013,962.
Rand, Burton, to Autosonics Inc. Solvent recovery system. 4,012,847, Cl. 34-75.000.
Ransomes Sims & Jefferies Limited: *See—*
Gaskin, Graham Edward, 4,013,301.
Raschack, Manfred: *See—*
Westermann, Albert; Zimmermann, Frank; Wuppermann, Dirk; Friedrich, Ludwig; and Raschack, Manfred, 4,013,663.
Rauenbuehler, John A.: *See—*
Graham, Robert O.; and Rauenbuehler, John A., 4,013,985.
Rausch, Richard E., to UOP Inc. Dehydrogenation method. 4,013,733, Cl. 260-668.00D.
Rawcliffe, Gordon Hindle: *See—*
Broadway, Alexander Richard William; Fong, William; and Rawcliffe, Gordon Hindle, 4,013,909.
Ray, George C., to General Foods Corporation. Induction sealed closure. 4,013,188, Cl. 215-347.000.
Ray, Leonard N., Jr., to Armstrong Cork Company. Back dyeing, tufting, and hot air sublimation of dyes to pile of carpets. 4,013,407, Cl. 8-17.000.
Raymond International Inc.: *See—*
Gendron, George J., 4,012,917.
Raynaud, Guy M.: *See—*
Fauran, Claude P.; Eberle, Jeannine A.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,013,768.
Raytheon Company: *See—*
Keith, James A., 4,012,850.
Kirkland, Robert E., 4,014,023.
RCA Corporation: *See—*
den Hollander, Willem, 4,013,923.
Gavrilovic, Dragan Milan, 4,013,582.
Pinch, Harry Louis; and Moss, Herbert Irwin, 4,013,830.
Roach, William Ronald, 4,013,345.
Realization Ultrasoniques: *See—*
Dory, Jacques, 4,012,952.
Rear, Ian Graeme. Drill rod stabilizing tool. 4,013,325, Cl. 308-4.00A.

Reardon, Robert C., Jr.: *See—*
Gutierrez, Eddie N.; and Reardon, Robert C., Jr., 4,013,722.
Recognition Equipment Incorporated: *See—*
Erwin, Jerry D.; Duvall, Dale R.; and Habitzreiter, Richard K., 4,013,999.
Treadwell, Stephen Smith, III, 4,013,997.
Rederiaktiebolaget Nordstjernan: *See—*
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,487.
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,488.
Reed, Gary William: *See—*
Reichen, John Erwin; Meyer, Richard Neff; and Reed, Gary William, 4,013,855.
Reed, Russell, Jr.: *See—*
Shaw, Graham C.; and Reed, Russell, Jr., 4,013,491.
Reesman, Stanley H., to General Foods Corporation. Corn flake process and product. 4,013,802, Cl. 426-621.000.
Refflinghaus, Bernd: *See—*
Dornaus, Johannes; Lahmer, Jurgen; and Refflinghaus, Bernd, 4,013,956.
Regenbrecht, Ludwig, to Peddinghaus, Rolf. Apparatus for controlling movement of stamping device. 4,012,977, Cl. 83-368.000.
Regie Nationale des Usines Renault: *See—*
Wagner, Andre, 4,012,990.
Reichen, John Erwin; Meyer, Richard Neff; and Reed, Gary William, to Tektronix, Inc. Modular pushbutton switch. 4,013,855, Cl. 200-314.000.
Reichenberger, Helmut: *See—*
Kresse, Heinz; and Reichenberger, Helmut, 4,013,067.
Reichley, Fred Jay: *See—*
Podella, Carl Walter; and Reichley, Fred Jay, 4,013,595.
Reidelbach, Willi; Grach, Herbert; Lutze, Hans; and Weidemann, Dieter, to Daimler-Benz Aktiengesellschaft. Lateral protection for motor vehicles. 4,013,317, Cl. 296-146.000.
Reilly, Joseph R., to Monsanto Company. Workpiece carrier assembly. 4,013,164, Cl. 198-655.000.
Reinders, Michiel Antonius, to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Omnidirectional antenna for around a mast. 4,014,027, Cl. 343-779.000.
Reinehr, Ulrich; Lenz, Hans; Nogaj, Alfred; and Blankenstein, Gunter, to Bayer Aktiengesellschaft. Process for continuously dyeing filaments of slivers of wet-spun acrylonitrile polymers. 4,013,406, Cl. 8-17.000.
Reininger, Wolfgang; and Hartl, Alfons, to Atlantic Research Institute Limited. Process of catalytic oxidation of lupulones to hulupones. 4,013,721, Cl. 260-586.00D.
Reinmold, Heinz-Josef, to Saint-Gobain Industries. Apparatus for cutting glass. 4,012,974, Cl. 83-6.000.
Reis, August; Quentin, Karl-Ernst; and Weil, Ludwig, to Sachs-Systemtechnik GmbH. Method and apparatus for purifying water contaminated with anodically oxidizable organic matter. 4,013,554, Cl. 210-40.000.
Reiss, John R.: *See—*
Worbois, Robert J.; and Reiss, John R., 4,013,322.
Reitman, Abraham Isadore. Twist-lock valve improvement. 4,013,092, Cl. 137-426.000.
Reitz, Daniel M. Bourke type engine. 4,013,048, Cl. 123-56.0BC.
Reliable Electric Company: *See—*
Gilberts, Alexander George, 4,013,927.
Rembaum, Alan, to California Institute of Technology. Ionene polymers for selectively inhibiting the vitro growth of malignant cells. 4,013,507, Cl. 195-1.800.
Rembold, Heinz: *See—*
Lohse, Friedrich; Munk, Kurt; and Rembold, Heinz, 4,013,698.
Renaut, Jacques: *See—*
Florent, Jean; Lunel, Jean; and Renaut, Jacques, 4,013,515.
Renier, Jozef: *See—*
Weiler, Raoul; Leuridan, Joel; and Renier, Jozef, 4,013,755.
Research Corporation: *See—*
Kupchan, S. Morris; and Kameswaran, Venkataraman, 4,013,664.
Restaurant Technology, Inc.: *See—*
Strong, William K., 4,012,808.
Rey, Hanz-Georg: *See—*
Rittersdorf, Walter; Guthlein, Werner; Werner, Wolfgang; Rey, Hanz-Georg; and Rieckmann, Peter, 4,013,416.
Rheinheimer, Martin. Air conditioner. 4,013,120, Cl. 165-48.000.
Rheinische Braunkohlenwerke AG: *See—*
Schulten, Rudolf, 4,013,781.
Rheinmetall G.m.b.H.: *See—*
Germershausen, Raimond; and Becker, Wilfried, 4,012,986.
Rhoads, Kenneth A.: *See—*
Wirt, Leon A.; and Rhoads, Kenneth A., 4,013,130.
Rhody, Howard A. Water vessel propelled by motorized land vehicle. 4,013,029, Cl. 114-255.000.
Rhone-Poulenc Industries: *See—*
Cassat, Robert, 4,013,600.
Rhone-Poulenc S.A.: *See—*
Bouchaudon, Jean; Bourat, Guy; and Margraff, Rodolphe, 4,013,565.
Florent, Jean; Lunel, Jean; and Renaut, Jacques, 4,013,515.
Passedouet, Andre Henri; and Pipon, Robert, 4,013,699.
Rice, Harold B., to John Burton Machine Corporation. Band applying apparatus. 4,012,972, Cl. 82-70.200.
Richard, Raymond: *See—*
Poignant, Pierre; Borrod, Guy; and Richard, Raymond, 4,013,451.
Richards, William, to American Optical Corporation. Method of making artificial intraocular lenses. 4,012,823, Cl. 29-418.000.
Richardson-Merrell Inc.: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,013,762.
Richmond, Albert R.; and Appleman, William S., to Richmond Manufacturing Company, The. Portable earth boring machine with steering head. 4,013,134, Cl. 175-73.000.
Richmond Manufacturing Company, The: *See—*
Richmond, Albert R.; and Appleman, William S., 4,013,134.
Richter, Peter: *See—*
Volkert, Otto; Wigger, August; Zuerger, Manfred; and Richter, Peter, 4,013,806.
Ricoh Co., Ltd.: *See—*
Namiki, Ryoichi; and Muramatsu, Shigeru, 4,013,871.
Ridgway, Frederick Arthur: *See—*
Lowe, Edward James; and Ridgway, Frederick Arthur, 4,013,756.
Riebel, Hans-Jochem: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,657.
Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,794.
Rieckmann, Peter: *See—*
Rittersdorf, Walter; Guthlein, Werner; Werner, Wolfgang; Rey, Hanz-Georg; and Rieckmann, Peter, 4,013,416.
Riedisser, Gunter: *See—*
Finsterwalder, Kurt; and Riedisser, Gunter, 4,013,003.
Riedl, Frank E. Internal combustion engine. 4,012,903, Cl. 60-39.450.
Rieter Machine Works, Ltd.: *See—*
Weber, Kurt, 4,012,893.
Riggs, Michael T.: *See—*
Change, Nicholas D.; and Riggs, Michael T., 4,012,940.
Riker Laboratories, Inc.: *See—*
Banitt, Elden H.; and Bronn, William R., 4,013,670.
Scherrer, Robert A., 4,013,692.
Riley, William A.: *See—*
Stolkin, Walter J.; Riley, William A.; and Sejda, Henry J., 4,012,996.
Riley, William T. Collapsible binocular instrument. 4,013,341, Cl. 350-70.000.
Ritota, Michael C.; and Mancini, L. Phillip, to M.E.D.S. Corporation. Collecting device. 4,013,077, Cl. 128-295.000.
Rittersdorf, Walter; Guthlein, Werner; Werner, Wolfgang; Rey, Hanz-Georg; and Rieckmann, Peter, to Boehringer Mannheim G.m.b.H. Diagnostic means for the detection of protein in body fluids. 4,013,416, Cl. 23-253.0TP.
Riva, Mario; Toscano, Luciano; Grisanti, Giampiero; and Bianchetti, Alberto, to Pierrel S.p.A. Substituted 6,7-dihydro [1,7-ab](1) benzazepine compounds. 4,013,679, Cl. 260-326.900.
Roach, William Ronald, to RCA Corporation. Deformable mirror light valve and method of operating the same. 4,013,345, Cl. 350-161.00S.
Robert Bosch G.m.b.H.: *See—*
Weckenmann, Albert, 4,013,986.
Roberts, Gerald Bernard; and Roberts, Richard Eugene, to A. B. Chance Company. Expulsion interruption device for high voltage switches. 4,013,852, Cl. 200-146.00R.
Roberts, Richard Eugene: *See—*
Roberts, Gerald Bernard; and Roberts, Richard Eugene, 4,013,852.
Robiczek, Gunther: *See—*
Granitz, Fritz; Robiczek, Gunther; Jabkowski, Fridolin; and Stoger, Franz, 4,012,825.
Roby, Michael A.: *See—*
Tenney, Kenneth S.; and Roby, Michael A., 4,013,127.
Rocholl, Henning: *See—*
Klein, Willi; Rocholl, Henning; and Naydowski, Reinhard, 4,013,175.
Rockland, Inc.: *See—*
Pratt, Samuel S.; and Lalos, Peter N., 4,013,182.
Rockwell International Corporation: *See—*
Blasche, Thomas L., Jr., Kobbeman, Donald D.; and Corley, Boyce M., 4,013,743.
Dennison, Charles M., 4,013,969.
Ferris, DeLacy F., 4,013,195.
Juhasz, John Emil, 4,013,143.
Rockwell-Rimoldi S.p.A.: *See—*
Marforio, Nerino, 4,013,025.
Roger, Bernard; Ayel, Michel; and Debar, Francis, to U.S. Philips Corporation. Connection lugs in the form of a comb for power transistors. 4,013,337, Cl. 339-258.00R.
Rogers, Charles H.; Sullivan, Kevin J.; and Vance, Miles E., to Corning Glass Works. Apparatus for controlling the temperature of a liquid body. 4,013,038, Cl. 118-5.000.
Rogers, Graham: *See—*
Wood, Alan F. B.; Rogers, Graham; and Tuckett, Edward G., 4,013,982.
Rogers, Jack: *See—*
Travaglio, Dalny, 4,013,222.
Rogers, Leslie Richard: *See—*
Paget, Hugh Patrick Dryhurst; Rogers, Leslie Richard; Royle, James Kenneth Davenport; Stansfield, James Frederick; and Topham, Arthur, 4,013,687.

Rogowski, John D.: *See—*
Dowd, Allyn C.; and Rogowski, John D., 4,013,307.
Rohe, Lothar: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,657.
Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,794.
Rohs, Ulrich. Injection nozzle for liquids, particularly for fuels. 4,013,229, Cl. 239-493.000.
Rolland, Serge: *See—*
Granger, Rene; Labsley, Alain; and Rolland, Serge, 4,013,591.
Rolls-Royce (1971) Limited: *See—*
Hill, Roland John; and Jewell, Norman Thomas, 4,013,976.
Nightingale, Douglas John, 4,013,246.
Wildgoose, Paul; and Ubank, Raymond George, 4,013,424.
Roman, Steven A., to Shell Oil Company. N-(nitro(tetrahydro-2H-1,3-thiazin-2-ylidene)acetyl)benzamides. 4,013,766, Cl. 424-246.000.
Roper Corporation: *See—*
DeWeese, Raymond Paul, 4,013,312.
Roper, Manfred: *See—*
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.
Rosa, Giovanni; Morelli, Claudio; Brando, Pasquale; and Daghetti, Giuseppe, to Saipem S.p.A. Method for rapidly laying a pipeline in deep water by an anchored laying means, and the relative devices. 4,012,919, Cl. 61-108.000.
Rosen, William E. Tobacco expansion process. 4,013,082, Cl. 131-140.00P.
Rosenberg, Allan H.: *See—*
Weintraub, Leonard; and Rosenberg, Allan H., 4,013,785.
Rosenberg, H. Colman. System for purifying liquids. 4,013,558, Cl. 210-149.000.
Rosenberg, Lior. Fasteners particularly useful as orthopedic screws. 4,013,071, Cl. 128-92.00B.
Rosikiewicz, Kathleen Regina: *See—*
Stevens, Peter; Deuber, John Martin; and Rosikiewicz, Kathleen Regina, 4,013,523.
Ross, Sidney H.: *See—*
Teitell, Leonard; and Ross, Sidney H., 4,013,474.
Rossi, Alberto: *See—*
Haas, Georges; Ferrini, Pier Giorgio; and Rossi, Alberto, 4,013,708.
Haas, Georges; Jaques, Roland; Rossi, Alberto; and Ruegg, Martin, 4,013,719.
Roszelle, Wayne O.: *See—*
Plummer, Mark A.; Schroeder, Donald E., Jr.; and Roszelle, Wayne O., 4,013,125.
Roto-Finish Company: *See—*
Balz, Gunther W., 4,012,869.
Rotter, Gerhard: *See—*
Schoettle, Klaus; Wittkamp, Heinrich; Uhl, Karl; and Rotter, Gerhard, 4,014,042.
Rottger, Hans: *See—*
Berger, Wolfgang; and Rottger, Hans, 4,013,121.
Routien, John B.: *See—*
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 4,013,789.
Routson, Willis G., to United States of America, Navy. Inline mixer. 4,013,272, Cl. 259-4.00R.
Royle, James Kenneth Davenport: *See—*
Paget, Hugh Patrick Dryhurst; Rogers, Leslie Richard; Royle, James Kenneth Davenport; Stansfield, James Frederick; and Topham, Arthur, 4,013,687.
Rubbermaid Commercial Products, Inc.: *See—*
Tenney, Kenneth S.; and Roby, Michael A., 4,013,127.
Rudevskaya, Svetlana Ivanovna: *See—*
Kalabukhova, Ljudmila Nikolaenva; Rudevskaya, Svetlana Ivanovna; Petrighenko, Alexandr Alexandrovich; and Smurova, Alberta Sergeevna, 4,013,248.
Ruegg, Martin: *See—*
Haas, Georges; Jaques, Roland; Rossi, Alberto; and Ruegg, Martin, 4,013,719.
Ruhle, Manfred: *See—*
Muhlberger, Horst; and Ruhle, Manfred, 4,013,425.
Ruhrchemie Aktiengesellschaft: *See—*
Feichtinger, Hans; Birnkraut, Hans-Walter; Lutze, Siegfried; Payer, Wolfgang; and Schnier, Dieter, 4,013,822.
Rule, Clinton, to Rule Industries, Inc. Vertical shaft impeller pump apparatus. 4,013,383, Cl. 417-366.000.
Rule Industries, Inc.: *See—*
Rule, Clinton, 4,013,383.
Ruseff, Walter Z.: *See—*
Hein, Allyn J.; McMillan, William D.; and Ruseff, Walter Z., 4,013,381.
Rush, James B.: *See—*
Logan, Arthur D.; and Rush, James B., 4,013,101.
Russel Bowen Systems Ltd.: *See—*
Porter, John Brian, 4,012,933.
Russo, Herman J. Device for conveniently lifting and transporting a large sheet of material. 4,013,202, Cl. 224-45.00M.
Rutherford, Gaery Davis. Apparatus and method for transferring a patient from one bed to another. 4,012,799, Cl. 5-81.00R.
Ryan, Frederick M.; and Miller, Robert C., to Westinghouse Electric Corporation. Phosphor identification method, particularly adapted for use with explosives, for providing a distinctive information label. 4,013,490, Cl. 149-2.000.
Ryder, Francis E.: *See—*
Thomas, Michael D.; and Ryder, Francis E., 4,013,410.
Ryder International Corporation: *See—*
Thomas, Michael D.; and Ryder, Francis E., 4,013,410.
Ryding, Geoffrey: *See—*
Schott, Charles M., Jr.; and Ryding, Geoffrey, 4,013,262.
S. C. Johnson & Son, Inc.: *See—*
Dwyer, Sean G.; and Hackbarth, Daryl J., 4,013,607.
Podella, Carl Walter; and Reichley, Fred Jay, 4,013,595.
S I G Schweizerische Industrie-Gesellschaft: *See—*
Fluck, Rene, 4,013,179.
Sabee, C. Craig: *See—*
Sabee, Reinhardt N.; and Sabee, C. Craig, 4,013,816.
Sabee, Reinhardt N.; and Sabee, C. Craig, to Draper Products, Inc. Stretchable spun-bonded polyolefin web. 4,013,816, Cl. 428-288.000.
Sachs-Systemtechnik GmbH: *See—*
Reis, August; Quentin, Karl-Ernst; and Weil, Ludwig, 4,013,554.
Sadao, Okuyama: *See—*
Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, 4,013,001.
Safe-T-Cut Incorporated: *See—*
Baer, Richard I.; and Bellivue, Kenneth M., 4,012,836.
Safe Way Hydraulics, Inc.: *See—*
Stratman, Paul E., 4,013,388.
Safetech, Inc.: *See—*
Hoppert, Bruce Noel; and Berghausen, Alfred, III, 4,013,519.
Saigo, Hideaki: *See—*
Masuda, Kinji; Saigo, Hideaki; Naito, Kazuo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,013,817.
Saint-Gobain Industries: *See—*
Reinmold, Heinz-Josef, 4,012,974.
Saipem S.p.A.: *See—*
Rosa, Giovanni; Morelli, Claudio; Brando, Pasquale; and Daghetti, Giuseppe, 4,012,919.
Saito, Tadaomi: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, 4,013,800.
Saito, Takemi: *See—*
Ando, Kunio; and Saito, Takemi, 4,013,339.
Sakamaki, Hisashi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,013,354.
Sakamoto, Jyunji; Imaizumi, Norio; and Shiratani, Eisuke, to Tokyo Sanyo Electric Co., Ltd.; and Sanyo Electric Co., Ltd. High speed switching circuit which reduces effect of minor carrier storage and prevents undesired oscillation. 4,013,903, Cl. 307-300.000.
Sakata Shokai Ltd.: *See—*
Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, 4,014,031.
Sams, Lawrence L., II: *See—*
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.
Sandel, Dan. Disposable container for surgical instruments. 4,013,109, Cl. 150-52.00R.
Sanders Associates, Inc.: *See—*
Blitz, Daniel, 4,013,885.
Sandoz, Inc.: *See—*
Bennett, Gregory B., 4,013,767.
Hardtmann, Goetz E., 4,013,646.
Sandoz Ltd.: *See—*
Altermatt, Ruedi, 4,013,636.
Closse, Annemarie; Haefliger, Walter; and Hauser, Daniel, 4,013,690.
Sanyo Electric Co., Ltd.: *See—*
Sakamoto, Jyunji; Imaizumi, Norio; and Shiratani, Eisuke, 4,013,903.
Saracino, Paolo: *See—*
Zavatti, Michele; Baravalle, Vittorio; and Saracino, Paolo, 4,013,603.
Sargent, Mary Elvera: *See—*
Sargent, Otto E., 4,013,881.
Sargent, Otto E., to Sargent, Mary Elvera. Safety signal cane. 4,013,881, Cl. 240-6.420.
Sarinopoulos, George A.; McCarthy, Robert E.; and Waldrop, Joseph R., to Honeywell Information Systems, Inc. Card cage assembly. 4,013,928, Cl. 361-380.000.
Sato, Isao; and Kato, Makoto, to Matsushita Electric Industrial Company, Limited. Fourier transform holography using pseudo-random phase shifting of object illuminating beams and apodization. 4,013,338, Cl. 350-3.500.
Sato, Takami: *See—*
Horigome, Toshinori; Hamada, Sadanori; and Sato, Takami, 4,013,917.
Sato, Yoshiaki: *See—*
Kuwada, Yutaka; Meguro, Kanji; Natsugari, Hideaki; Sato, Yoshiaki; and Tawada, Hiroyuki, 4,013,763.
Savio, Ermanno: *See—*
Calamani, Sergio; Turri, Eugenio; and Savio, Ermanno, 4,013,238.
Sawatzky, Erich: *See—*
Ko, Wen-Chuang; and Sawatzky, Erich, 4,013,891.
Saxon, Bruce Ronald, to International Telephone and Telegraph Cor-

poration. Line circuit for a universal key/internal telephone system. 4,013,844, Cl. 179-99.000.

Schachte, John J.: *See—*
Lohneis, Earl R.; and Schachte, John J., 4,013,176.

Schaefer, Horst: *See—*
Gordon, Wolfgang; Leugering, Hans Joachim; and Schaefer, Horst, 4,013,617.

Schafer, Dietmar: *See—*
Frommer, Werner; Puls, Walter; Schafer, Dietmar; and Schmidt, Delf, 4,013,510.

Scharbert, Juergen: *See—*
Groeger, Ingo; and Scharbert, Juergen, 4,014,008.

Scharfe, ames A., Jr. Circuit for preventing errors in decoding information from distorted pulses. 4,013,965, Cl. 325-320.000.

Scharmann & Co.: *See—*
Dornbluth, Jurgen R. K.; Engel, Gerd; and Klassen, Heinrich, 4,012,818.

Scheffels, Wilhelm: *See—*
Steigerwald, Karl Heinz; Konig, Dietor; Scheffels, Wilhelm; and Glieneck, Klaus, 4,013,261.

Scherer, Otto; Horlein, Gerhard; and Schonowsky, Hubert, to Hoechst Aktiengesellschaft. Urea derivatives and their use as herbicides. 4,013,452, Cl. 71-120.000.

Scherrer, Robert A., to Riker Laboratories, Inc. Certain 3-phenyl-benzofuran lower alkanoic acids and esters thereof. 4,013,692, Cl. 260-346.20R.

Scheuten, Heinz: *See—*
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.

Schibler, Luzius: *See—*
Merz, Jurg; and Schibler, Luzius, 4,013,655.

Schindler, Donald R., to General Electric Company. Spring shorting means for photoflash array. 4,013,848, Cl. 200-51.100.

Schindler, Hubert: *See—*
Fischer, Hermann; Schindler, Hubert; Kuhrt, Winfried; and Weidenbach, Guenter, 4,013,587.

Schirmer, Robert M., to Phillips Petroleum Company. Method of operating a gas turbine combustor having an independent airstream to remove heat from the primary combustion zone. 4,012,902, Cl. 60-39.020.

Schlenker, Gerhard: *See—*
Hafner, Reinhard; Wojik, Karl; and Schlenker, Gerhard, 4,013,058.

Schmid, August, to Patentverwertungs-und Finanzierungsgesellschaft Serania AG. Light projector and detector unit. 4,013,886, Cl. 250-221.000.

Schmidt, Andreas, to Ciba-Geigy Corporation. Phenol acetals. 4,013,619, Cl. 260-45.80A.

Schmidt, Delf: *See—*
Frommer, Werner; Puls, Walter; Schafer, Dietmar; and Schmidt, Delf, 4,013,510.

Schmitt, Ewald, to Messer Griesheim GmbH. Device for positioning a cutting torch aggregate. 4,013,277, Cl. 266-76.000.

Schneider, Barry L., to Chemtrust Industries Corporation. Foam generating sprayer apparatus. 4,013,228, Cl. 239-401.000.

Schneider, Franz; and Schumann, Burkhard, to L. Schuler GmbH. Process and apparatus for actuating the ram weight compensation mechanism of a press. 4,013,002, Cl. 100-35.000.

Schneider, Harold N.; Titus, Charles H.; and Wittle, J. Kenneth, to General Electric Company. Deep submersible power electrode assembly for ground conduction of electricity. 4,013,538, Cl. 204-280.000.

Schneider, Helmut, to Werner & Mertz GmbH. Carpet shampooer. 4,012,805, Cl. 15-50.00R.

Schneider, Mark Joel: *See—*
Bornmann, Robert Edward; Cowan, John Richard; and Schneider, Mark Joel, 4,013,879.

Schneiter, Fred E.; Dykstra, Philip R.; and Kennedy, Carver G., to Thiokol Corporation. Gas generator with expandable cartridge. 4,013,010, Cl. 102-39.000.

Schnier, Dieter: *See—*
Feichtinger, Hans; Birnkraut, Hans-Walter; Lutze, Siegfried; Payer, Wolfgang; and Schnier, Dieter, 4,013,822.

Schoeller, Alexander, deceased; and by von Podewils-Schoeller, Christina, heiress. Flexure-compensating device for flexible pallets supporting very heavy loads. 4,013,020, Cl. 108-51.100.

Schoeller, Alexander, deceased: *See—*
Steinlein, Rudolf; Schoeller, Alexander, deceased; and Schoeller, Christina, administratrix, 4,013,021.

Schoeller, Christina, administratrix: *See—*
Steinlein, Rudolf; Schoeller, Alexander, deceased; and Schoeller, Christina, administratrix, 4,013,021.

Schoenmakers, Theodorus Maria Berendina: *See—*
van Osenbruggen, Cornelis; van Ruler, Johannes; and Schoenmakers, Theodorus Maria Berendina, 4,013,863.

Schoettle, Klaus; Wittkamp, Heinrich; Uhl, Karl; and Rotter, Gerhard, to BASF Aktiengesellschaft. Tape recorder and magnetic tape cassette. 4,014,042, Cl. 360-132.000.

Scholkens, Bernward: *See—*
Wissmann, Hans; Geiger, Rolf; Lindner, Ernst; and Scholkens, Bernward, 4,013,791.

Schollmeier, Gero, to Siemens Aktiengesellschaft. Equalizer for partial response signals. 4,013,980, Cl. 333-18.000.

Schonowsky, Hubert: *See—*
Scherer, Otto; Horlein, Gerhard; and Schonowsky, Hubert, 4,013,452.

Schott, Charles M., Jr.; and Ryding, Geoffrey, to Varian Associates. Rotary apparatus for moving workpieces through treatment beam with controlled angle of orientation and ion implanter incorporating such apparatus. 4,013,262, Cl. 250-492.00A.

Schranz, Karl-Wilhelm: *See—*
Bergthaller, Peter; Himmelmann, Wolfgang; and Schranz, Karl-Wilhelm, 4,013,468.

Schrenk, Heinrich Maria: *See—*
Bharucha, Kekhusroo R.; Ajdukovic, Djordje; Pavilanis, Vytautas; and Schrenk, Heinrich Maria, 4,013,770.

Schrick, Hans Jurgen: *See—*
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.

Schroder, Herbert; and Schroder, Reinhard. Apparatus for dividing and kneading a piece of dough. 4,013,275, Cl. 259-185.000.

Schroder, Reinhard: *See—*
Schroder, Herbert; and Schroder, Reinhard, 4,013,275.

Schroeder, Donald E., Jr.: *See—*
Plummer, Mark A.; Schroeder, Donald E., Jr.; and Roszelle, Wayne O., 4,013,125.

Schroeder, Wilburn C. Removal of sulfur from carbonaceous fuel. 4,013,426, Cl. 44-1.00R.

Schulten, Rudolf, to Rheinische Braunkohlenwerke AG. Process for obtaining hydrogen and oxygen from water using iron and chlorine. 4,013,781, Cl. 423-579.000.

Schuman, Edwin Kaine. Method of preparing liquid fertilizer. 4,013,443, Cl. 71-31.000.

Schuman, Mark. Thermally driven piston apparatus having an angled cylinder bypass directing fluid into a thermal lag heating chamber beyond the bypass. 4,012,910, Cl. 60-520.000.

Schumann, Burkhard: *See—*
Schneider, Franz; and Schumann, Burkhard, 4,013,002.

Schurger, Rainer: *See—*
Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, 4,013,327.

Schuster, Samuel R., to Ovutime, Inc. Processes for menstrual cycle phase determination. 4,013,066, Cl. 128-2.00R.

Schwartz, Willis T., Jr.: *See—*
Dorfman, Edwin; Schwartz, Willis T., Jr.; and Hindersinn, Raymond R., 4,013,815.

Schwarz, Wilhelm, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Grab or grab bucket and method of operating same. 4,012,856, Cl. 37-187.000.

Schwerdtel, Wulf: *See—*
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,013,709.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,013,723.

Schwerdtfeger, Oswald: *See—*
Dawihl, Walther; Barthels, Gottfried; Bruhn, Gustav; Kittendorf, Max; Roper, Manfred; Scheuten, Heinz; and Schwerdtfeger, Oswald, 4,012,824.

Sciavolino, Frank C.: *See—*
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 4,013,789.

Scientific and Applied Processes Pty., Ltd.: *See—*
Vale, William Henry, 4,013,440.

Scott, Charles: *See—*
Boleky, Edward J.; and Scott, Charles, 4,013,484.

Scott, Dale K.: *See—*
Calvert, Rodney K.; and Scott, Dale K., 4,012,887.

Scott, James J. Friction rock stabilizers. 4,012,913, Cl. 61-45.00B.

Scott, Lynn S., to Parker-Hannifin Corporation. Sealing ring. 4,013,299, Cl. 277-165.000.

Scott, Roger Hardiman, to Imperial Chemical Industries Limited. Process for purifying methanol by distillation. 4,013,521, Cl. 203-85.000.

Seaquist Valve Company, Div. of Pittway Corporation: *See—*
Ewald, Ronald F., 4,013,197.

Sebag, Henri: *See—*
Varlerberghe, Guy; and Sebag, Henri, 4,013,787.

Sebastiani, Enrico, to Tag Vertrieb A.G. Method and device for bending pipes. 4,012,936, Cl. 72-369.000.

Seggelin, Douglas H.: *See—*
Eachus, Joseph J.; Graff, Theodore S.; and Seggelin, Douglas H., 4,013,835.

Seitz, C. Thomas: *See—*
Dawson, Daniel J.; Otteson, Kenneth M.; and Seitz, C. Thomas, 4,013,801.

Sejda, Henry J.: *See—*
Stolkin, Walter J.; Riley, William A.; and Sejda, Henry J., 4,012,996.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See—*
Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, 4,013,476.

Self, James M., to H. H. Robertson Company. Method of preparing shaped articles from polymerizable compositions. 4,013,614, Cl. 260-40.00R.

Sella, Claude: *See—*
Cohen-Solal, Gerard; Zozime, Alain; and Sella, Claude, 4,013,533.

Sellors, Roland George Ronald; and Cooksey, Raymond, to G.K.N.

Group Services Limited. Method of die casting high melting point metal. 4,013,115, Cl. 164-51.000.

Sellstedt, John H.; and Klaubert, Dieter H., to American Home Products Corporation. Morpholine containing tetrazole-5-carboxamide derivatives. 4,013,647, Cl. 260-247.20A.

Sels, Francis Jeanne: *See—*
Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, 4,013,471.

Semlitsch, Manfred: *See—*
Dorre, Erhard; Semlitsch, Manfred; and Frey, Otto, 4,012,795.

Semonchik, William: *See—*
Joss, Roger V.; Semonchik, William; and Unwin, Arthur H., 4,013,856.

Senet, Jean-Pierre G.: *See—*
Cartier, Jean-Pierre L.; and Senet, Jean-Pierre G., 4,013,702.

Sentinella, Victor Edward. Extinguisher mountings. 4,013,255, Cl. 248-313.000.

Seth, Kishan K., to Ethyl Corporation. Recovery of iodine from brine with linear alkyl benzene solvents. 4,013,780, Cl. 423-501.

Settle, Wayne L.; and Funston, Lowell G. Electroencephalographic activated control system. 4,013,068, Cl. 128-2.10B.

Sexton, Daniel B.: *See—*
Sexton, Ronald R., 4,013,104.

Sexton, Ronald R., to Sexton, Daniel B., a part interest. Dispenser for shortening or the like. 4,013,104, Cl. 141-18.000.

Sforzini, Richard H.: *See—*
Burkhalter, John E.; and Sforzini, Richard H., 4,012,987.

Shafer Valve Company: *See—*
Covington, Morris T.; and Griffin, Steven M., 4,012,944.

Shaffer, Gary W.; Tornell, Irene; and Purzycki, Kenneth L., to Givaudan Corporation. Fragrance compositions containing N-(2-furfuryl)-pyrrole. 4,013,593, Cl. 252-522.000.

Sharp Kabushiki Kaisha: *See—*
Yasunaga, Tatsuhiro, 4,014,039.

Shavel, John, Jr.: *See—*
Brown, Richard E.; and Shavel, John, Jr., 4,013,671.

Shaw, David H.: *See—*
Gudelis, David A.; and Shaw, David H., 4,013,542.

Shaw, Graham C.; and Reed, Russell, Jr., to Thiokol Corporation. Incendiary compositions of magnesium and fluoroalkyl phosphate esters. 4,013,491, Cl. 149-19.300.

Shaw, John Charles Michael, to Spotmanor Limited. Rearing units. 4,013,044, Cl. 119-16.000.

Shaw-Walker Company, The: *See—*
Paquette, Kenneth N., 4,013,257.

Shell Oil Company: *See—*
Chiu, Ying C.; and Hill, Harold J., 4,013,569.
Roman, Steven A., 4,013,766.

Sherritt, Jay G.; and Eccher, Joseph A., to Ball Brothers Research Corporation. Audio indicating system. 4,014,016, Cl. 340-384.00R.

Shibuya, Hakushi: *See—*
Akiyoshi, oshio; and Shibuya, Hakushi, 4,013,895.

Shimada, Masayoshi: *See—*
Nagao, Yukio; and Shimada, Masayoshi, 4,013,367.

Shimadzu Seisakusho Ltd.: *See—*
Nakano, Kiyokazu; Yamamoto, Hiroshi; and Ito, Yasunori, 4,013,364.

Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, to Ajinomoto Co., Inc. 4-Hydroxy-5-methyl-2,3-dihydrofuran-3-one and methods of making and using the same. 4,013,800, Cl. 426-536.000.

Shimizu, Akihiko: *See—*
Hayashi, Takao; and Shimizu, Akihiko, 4,013,580.

Shimokawa, Wataru: *See—*
Murakami, Saburo, 4,013,028.

Shinoda, Yoshio: *See—*
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,012,948.

Shintani, Sotokichi; Tamori, Michitoshi; and Nagai, Nobuo, to Kokusai Denshin Denwa Kabushiki Kaisha. Constant-resistance coupled-line type equalizer. 4,013,981, Cl. 333-28.00R.

Shiokawa, Kozo: *See—*
Kishino, Shigeo; Kudamatsu, Akio; Takase, Iwao; Shiokawa, Kozo; and Yamaguchi, Shin-ichi, 4,013,793.

Shirasu, Kazuo: *See—*
Idota, Yoshio; Iwano, Haruhiko; Shirasu, Kazuo; and Matsushita, Sachio, 4,013,527.

Shiratani, Eisuke: *See—*
Sakamoto, Jyunji; Imaizumi, Norio; and Shiratani, Eisuke, 4,013,903.

Shkurko, Leonid Stepanovich: *See—*
Burov, Igor Sergeevich; Bysjuk, Vladimir Vladimirovich; Mosse, Alfred Lvovich; Shkurko, Leonid Stepanovich; and Vashkevich, Vyacheslav Andreevich, 4,013,415.

Shoe & Allied Trades Research Association, The: *See—*
Goffe, Frederick William Frank; and Pilkington, Donald James, 4,012,943.

Shoot The Hoops, Inc.: *See—*
Cohen, Monroe; and Dorothea, Gale, 4,013,292.

Shorthill, Richard W.: *See—*
Vali, Victor; Shorthill, Richard W.; Goldstein, Raymond; and Krogstad, Reuben S., 4,013,365.

Shuichi, Kawasaki: *See—*
Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, 4,013,001.

Shupack, Saul I.; and Malin, Stephen F., to Villanova University. Method for detecting hepatitis associated antigen. 4,013,411, Cl. 23-230.00B.

Shuster, Frank A.: *See—*
Armstrong, Timothy G.; Kroll, Arthur S.; and Shuster, Frank A., 4,013,041.

Siegel, Hardo: *See—*
Merkle, Hans Rupert; and Siegel, Hardo, 4,013,684.

Siemens Aktiengesellschaft: *See—*
Beckmann, Oskar, 4,014,003.
Berger, Wolfgang; and Rottger, Hans, 4,013,121.
Grassme, Ulrich, 4,013,036.
Groeger, Ingo, 4,014,007.
Groeger, Ingo; and Scharbert, Juergen, 4,014,008.
Holtz, Joachim, 4,013,014.
Kresse, Heinz; and Reichenberger, Helmut, 4,013,067.
Nischik, Herbert; and von Sturm, Ferdinand, 4,013,522.
Preissinger, Karl-Heinz; and Wehnelt, Ulrich, 4,012,817.
Schollmeier, Gero, 4,013,980.
Siepmann, Bernd Josef; and Thilo, Peer, 4,013,935.
Starck, Alexander; and Postl, Wolfgang, 4,013,827.

Siepmann, Bernd Josef; and Thilo, Peer, to Siemens Aktiengesellschaft. Circuit arrangement for a DC to DC converter. 4,013,935, Cl. 321-2.000.

Silva, Rene N. Apparatus for concentrating liquid-solid mixture. 4,012,846, Cl. 34-57.00R.

Siminoff, Paul: *See—*
Crenshaw, Ronnie Ray; Luke, George Michael; and Siminoff, Paul, 4,013,665.

Simmons Company: *See—*
Hutchinson, Ronald G.; and Dillon, Paul J., 4,012,802.

Singer Company, The: *See—*
Mason, Richard Storrs; Bible, Robert Edward; and Beach, James Robert, 4,013,208.
Smeda, Ralph; and Swartz, Martha S., 4,013,294.

Sinn, Richard: *See—*
Kuerten, Heribert; Nagel, Otto; Sinn, Richard; Weinle, Werner; and Engler, Peter, 4,013,744.

Siposs, George G. Implantable medication-dispensing device. 4,013,074, Cl. 128-260.000.

Sircar, Shivaji; and Zondlo, John W., to Air Products and Chemicals, Inc. Fractionation of air by adsorption. 4,013,429, Cl. 55-33.000.

Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Combating pests with dichlorovinylthionophosphoric acid ester amides. 4,013,795, Cl. 424-219.000.

Skagerlund, Lars-Erik: *See—*
Blom, Rolf Helge; Forshufvud, Sten Harald Ragnar; and Skagerlund, Lars-Erik, 4,013,244.

Skala, George Frank, to Environment/One Corporation. Optical fluid contamination and change monitor processing circuit. 4,013,953, Cl. 324-130.000.

SKF Industrial Trading and Development Company, B.V.: *See—*
Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, 4,013,327.

SKF Nova A.B.: *See—*
Lundgren, Bengt, 4,012,923.

Skillicorn, Douglas E., to B. F. Goodrich Company, The. Liquid vinylidene-terminated polymers. 4,013,710, Cl. 260-484.00A.

Skrabacz, Donald J.: *See—*
Nelson, Arthur L.; Skrabacz, Donald J.; and Young, Burbank, 4,013,775.

Skutta, Frank Robert, to Motorola, Inc. Automatic gain control means for a single sideband radio receiver. 4,013,964, Cl. 325-319.000.

Sloan Valve Company: *See—*
Snodgrass, James D.; and Pilolla, Joseph J., 4,013,557.

Smalligan, Wayne J.; Kelly, Vincent J.; and Enad, Estela G., to Gerber Products Company. Preparation of a stabilized precooked baby food formulation thickened with modified tapioca starch. 4,013,799, Cl. 426-578.000.

Smeda, Ralph; and Swartz, Martha S., to Singer Company, The. Personality need hierarchy game. 4,013,294, Cl. 273-134.00B.

Smith, James Lanson: *See—*
Bonyhard, Peter Istvan; Chen, Yu-Ssu; and Smith, James Lanson, 4,014,009.

Smith, Jay A.; and Linde, James P., to Sperry Rand Corporation. Punch check apparatus. 4,013,216, Cl. 234-34.000.

Smith, Kendall S., II: *See—*
Kennedy, Robert J., Jr.; and Smith, Kendall S., II, 4,013,880.

Smith Kline & French Laboratories Limited: *See—*
Brown, Thomas Henry; Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,013,678.
Durant, Graham John; Ganellin, Charon Robin; and Parsons, Michael Edward, 4,013,659.
Durant, Graham John; Emmett, John Colin; Ganellin, Charon Robin; and Prain, Hunter Douglas, 4,013,769.

Smith, Robert: *See—*
Kronenberger, Paul E.; and Smith, Robert, 4,013,434.

Smith, Robert L., to Chemetron Corporation. Static seal with an open rotational mode. 4,013,297, Cl. 277-3.000.

Smith, Samuel Charles Henry, to G.K.N. Windsor Limited. Injection moulding machines. 4,013,392, Cl. 425-157.000.

SmithKline Corporation: *See—*
Colella, Donald F.; and Kaiser, Carl, 4,013,777.
DeMarinis, Robert M., 4,013,765.
Gleason, John Gerald, 4,013,764.

Smiths Industries Limited: *See—*
Goreham, Kenneth A.; and Perry, John R., 4,013,746.

Smrekar, Donald E.; Bilan, Peter; and Hamilton, James, to Parker-Hannifin Corporation. Hydraulically operated attachment for machine tools. 4,012,992, Cl. 90-15.00R.
Smurova, Alberta Sergeevna: *See—*
Kalabukhova, Ljudmila Nikolaenva; Rudevskaya, Svetlana Ivanovna; Petrighenko, Alexandr Alexandrovich; and Smurova, Alberta Sergeevna, 4,013,248.
Snam Progetti S.p.A.: *See—*
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, 4,013,589.
Buonomo, Franco; Fattore, Vittorio; and Notari, Bruno, 4,013,590.
Guadalupi, Mario; Pagani, Giorgia; Zardi, Umberto; and Paris, Ivo, 4,013,718.
Snijders Metaalwarenfabriek B.V.: *See—*
Snijders, Willem, 4,013,173.
Snijders, Willem, to Snijders Metaalwarenfabriek B.V. Stand including moveable supports for accommodating articles of different heights and depths. 4,013,173, Cl. 211-126.000.
Snodgrass, James D.; and Pilolla, Joseph J., to Sloan Valve Company. Sewage treatment apparatus. 4,013,557, Cl. 210-138.000.
Sobajima, Katsunobu: *See—*
Imabuchi, Yoshihisa; Kurami, Kenshi; Akiyama, Yoshinori; and Sobajima, Katsunobu, 4,013,306.
Soberman Establishment: *See—*
Marocco, Giuseppe, 4,013,809.
Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Bianchetti, Giuseppe; Pocar, Donato; and Stradi, Riccardo, 4,013,441.
Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Lupattelli, Carlo; and Miotti, Alfredo, 4,013,843.
Societe Anonyme dite: Laboratoire L. Lafon: *See—*
Lafon, Victor, 4,013,776.
Societe Anonyme dite: L'Oreal: *See—*
Varlerberghe, Guy; and Sebag, Henri, 4,013,787.
Societe Anonyme: Produits Chimiques Ugine Kuhlmann: *See—*
Giet, Claude, 4,013,759.
Societe Nationale des Poudres et Explosifs: *See—*
Cartier, Jean-Pierre L.; and Senet, Jean-Pierre G., 4,013,702.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Fournier, Jacques; and Nicolas, Michel, 4,014,021.
Societe Suisse pour l'Industrie Horlogere Management Services, S.A.: *See—*
Jaccard, Pierre-Ernest; and Hess, Heinrich, 4,013,343.
Soles, Otto H.: *See—*
Alverson, Thomas E.; Soles, Otto H.; Hopkins, Melvyn D.; and LeRow, Charles E., Jr., 4,013,853.
Solo Products Corporation: *See—*
Braverman, Leslie, 4,013,252.
Solovieff, Paul G., to Emhart Industries, Inc. Latch construction with improved anti-violation features. 4,012,929, Cl. 70-134.000.
Solvay & Cie: *See—*
Cabaraux, Emile, 4,013,536.
Somekh, George S., to Union Carbide Corporation. Process for the recovery of amides. 4,013,640, Cl. 260-239.30A.
Sommer, Helmut, to Daimler-Benz Aktiengesellschaft. Injection pump for air-compressing injection-type internal combustion engine. 4,013,055, Cl. 123-139.0AR.
Sommermeyer, Uwe: *See—*
Brinkmann, Hans; Eisele, Gottfried; Gormar, Helmut; Pabst, Horst; Putz, Helmut; Schrick, Hans Jurgen; and Sommermeyer, Uwe, 4,013,745.
Sony Corporation: *See—*
Akiyama, Katsuhiko, 4,012,833.
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawada, Yoshiyuki, 4,014,037.
Sorensen, Karsten; Bernstein, David H.; and Druke, Michael B., to Data General Corporation. Data processing system having a unique CPU and memory tuning relationship and data path configuration. 4,014,006, Cl. 340-172.500.
Soteropulos, Gust; and Meiers, Gerald Franklyn, to Deere & Company. Ground-rolled cylindrical baler. 4,012,892, Cl. 56-341.000.
Southard, James S., to C.G. Conn, Ltd. Percussion processor for electronic musical instrument. 4,012,982, Cl. 84-1.010.
Spayth, Frank J., to Magnavox Company, The. Sampled communication system. 4,013,958, Cl. 325-55.000.
Spaziani, Frederick F.: *See—*
Driscoll, John N.; and Spaziani, Frederick F., 4,013,913.
Speedcall Corporation: *See—*
Bradley, Donald A., 4,014,001.
Speidel, Blasius. Air evacuation valve for blood pressure measuring device. 4,013,265, Cl. 251-205.000.
Speiser, Peter. Delayed release pharmaceutical preparations. 4,013,784, Cl. 424-19.000.
Spencer, Dudley W. C. Horseshoe manufacture. 4,013,126, Cl. 168-4.000.
Sperry Rand Corporation: *See—*
Crane, John Reed, 4,012,832.
Josephs, Richard M., 4,013,803.
Moore, Harry W., III, 4,014,017.
Smith, Jay A.; and Linde, James P., 4,013,216.
Spielmann, Janos: *See—*
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.
Spille, Jurgen: *See—*
Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, 4,013,481.
Spinner, Ernest Elliott; and Hounsell, Melvin Wayne, to Marion Laboratories, Inc. Gas generating apparatus. 4,013,422, Cl. 23-282.000.
Spitzer, Wayne Alfred, to Eli Lilly and Company. 3-Substituted aminocephalosporins. 4,013,651, Cl. 260-243.00C.
Sporrong, Malte: *See—*
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,487.
Ramqvist, Lars H.; Grinder, Nils Olle; Sporrong, Malte; and Enghag, Per, 4,013,488.
Spotmanor Limited: *See—*
Shaw, John Charles Michael, 4,013,044.
Sprick, Kenneth: *See—*
Kaufmann, Harold; and Sprick, Kenneth, 4,013,282.
Springwater Mfg. Co., Inc.: *See—*
Stone, Guthrie B.; and Holmes, William F., 4,012,934.
Square D Company: *See—*
Dietz, Robert E.; Ophaug, Darrell P.; and Steve, Lynn B., 4,013,929.
Squires, Stanley J.: *See—*
Chitayat, Anwar; and Squires, Stanley J., 4,013,280.
Staats, Robert M.: *See—*
Barton, Dale S.; Stoyanov, Ben; and Staats, Robert M., 4,013,186.
Stafford, Donald Claude, to Chicago Bridge & Iron Company. Support for LNG ship tanks. 4,013,030, Cl. 114-74.00A.
Stahlecker, Fritz: *See—*
Stahlecker, Hans, 4,012,810.
Stahlecker, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. Drawing system arrangement for spinning machines. 4,012,810, Cl. 19-294.000.
Standard Pressed Steel Co.: *See—*
Dahl, Warren F., 4,012,828.
Stansfield, Fred, to Doncasters Moorside Limited. Bolt tightening apparatus and method. 4,012,826, Cl. 29-446.000.
Stansfield, James Frederick: *See—*
Paget, Hugh Patrick Dryhurst; Rogers, Leslie Richard; Royle, James Kenneth Davenport; Stansfield, James Frederick; and Topham, Arthur, 4,013,687.
Staples, Edward J., to Texas Instruments Incorporated. Stencil process for high resolution pattern replication. 4,013,502, Cl. 156-608.000.
Starck, Alexander; and Postl, Wolfgang, to Siemens Aktiengesellschaft. Process and an arrangement for facsimile coding with address insertion of a specific surface element scanned for transmission limiting fault effectiveness up to the next inserted address. 4,013,827, Cl. 358-263.000.
Stark, Howard M.; and Streifer, William, to Xerox Corporation. Halftone imaging with flying spot scanner system. 4,014,030, Cl. 346-160.000.
Starostin, Jury Alexandrovich: *See—*
Bagdasarov, Khachik Saakovich; Ilin, Nikolai Pavlovich; and Starostin, Jury Alexandrovich, 4,013,421.
Stauffer Chemical Company: *See—*
Liang, Shen Fu; and Zeleny, Richard Alan, 4,013,685.
Weil, Edward D., 4,013,814.
Stauter, John C.; and Pace, Gerald F., to Continental Oil Company. Static leaching copper ore. 4,013,754, Cl. 423-27.000.
Stedman, Robert Bruce: *See—*
Beseke, Kermit Myles; Ramsland, David Gordon; and Stedman, Robert Bruce, 4,013,962.
Steiger, Ferdinand; and Wahlen, Werner, to Mapatex Establishment. Saw blade and fret-saw combination and method for use thereof. 4,013,107, Cl. 144-35.00R.
Steigerwald, Karl Heinz; Konig, Dietor; Scheffels, Wilhelm; and Glieneck, Klaus, to Steigerwald Strahltechnik GmbH. Device for producing work pieces perforated by means of electron beams. 4,013,261, Cl. 250-453.000.
Steigerwald Strahltechnik GmbH: *See—*
Steigerwald, Karl Heinz; Konig, Dietor; Scheffels, Wilhelm; and Glieneck, Klaus, 4,013,261.
Steinberger, Lief H.: *See—*
Hintz, Doran M.; and Steinberger, Lief H., 4,012,970.
Steinbrecher, Ronald A.: *See—*
Hess, Richard E.; Steinbrecher, Ronald A.; and Goddard, Stephen A. A., 4,013,293.
Steinlein, Rudolf; Schoeller, Alexander, deceased; and by Schoeller, Christina, administratrix. Plastics material pallet. 4,013,021, Cl. 108-51.100.
Stendel, Wilhelm: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,657.
Maurer, Fritz; Riebel, Hans-Jochem; Rohe, Lothar; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,794.
Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Stendel, Wilhelm, 4,013,795.
Sterling Drug Inc.: *See—*
Pradt, Louis A., 4,013,560.
Sternbeck, Olaf, to Telefonaktiebolaget L M Ericsson. Integrated amplifier. 4,013,971, Cl. 330-23.000.
Steuerwald, Wilfred LeeRoy, to Deere & Company. Mowing apparatus adjustment means. 4,012,891, Cl. 56-305.000.
Steve, Lynn B.: *See—*
Dietz, Robert E.; Ophaug, Darrell P.; and Steve, Lynn B., 4,013,929.

Stevens, Henry C.: *See—*
Deli, Joseph; and Stevens, Henry C., 4,013,675.
Stevens, Peter; Deuber, John Martin; and Rosikiewicz, Kathleen Regina, to Oxy Metal Industries Corporation. Tin-gold electroplating bath and process. 4,013,523, Cl. 204-43.00G.
Stevens, Robert. Racket for tennis and similar games. 4,013,290, Cl. 273-73.00E.
Stewart, Edward C.: *See—*
Walter, Florian A.; and Stewart, Edward C., 4,013,022.
Stewart, Kent K.; Beecher, Gary R.; and Hare, Peter Edgar, to United States of America, Agriculture. Apparatus and method for rapid analyses of plurality of samples. 4,013,413, Cl. 23-230.00R.
Stewart-Warner Corporation: *See—*
Dinkelkamp, Henry T.; Carus, Bryce W.; and Norman, Robert J., 4,013,053.
Stiot, Jean-Pierre Henri; Leroy, Jean-Marie Louis; and Brouard, Claude Marie Henri Emile, to Produits Chimiques Ugine Kuhlmann. Water insoluble 6-(2-acyloxy-carbethoxy) benzothiazole-azo-benzene dyestuffs. 4,013,632, Cl. 260-158.000.
Stoger, Franz: *See—*
Granitz, Fritz; Robiczek, Gunther; Jabkowski, Fridolin; and Stoger, Franz, 4,012,825.
Stolka, Milan: *See—*
Turner, Sam R.; and Stolka, Milan, 4,013,623.
Stolkin, Walter J.; Riley, William A.; and Sejda, Henry J., to Stolmar Corporation. Apparatus for folding and compression of corrugated container blanks. 4,012,996, Cl. 93-36.300.
Stolmar Corporation: *See—*
Stolkin, Walter J.; Riley, William A.; and Sejda, Henry J., 4,012,996.
Stolpin, Roger Mitchell. Geodesic dome-like panels. 4,012,872, Cl. 52-81.000.
Stolzer, Claus; Kramer, Wolfgang; Buchel, Karl Heinz; and Meiser, Werner, to Bayer Aktiengesellschaft. Preparation of 1,2,4-triazolyl-(1)-phenoxy-acyl-methanes. 4,013,677, Cl. 260-308.00R.
Stone, Guthrie B.; and Holmes, William F., to Springwater Mfg. Co., Inc. Multipurpose metal working machine. 4,012,934, Cl. 72-324.000.
Stork Amsterdam B.V.: *See—*
Boer, Jort, 4,013,162.
Stoyanov, Ben: *See—*
Barton, Dale S.; Stoyanov, Ben; and Staats, Robert M., 4,013,186.
Stradi, Riccardo: *See—*
Bianchetti, Giuseppe; Pocar, Donato; and Stradi, Riccardo, 4,013,441.
Strange, Robert F., to Bausch & Lomb Incorporated. Electrographic segment electrode clamping assembly. 4,013,158, Cl. 197-1.00R.
Strasser, Alois: *See—*
Hechtl, Wolfgang; Wohlfarth, Ernst; and Strasser, Alois, 4,013,611.
Stratman, Paul E., to Safe Way Hydraulics, Inc. Support means for floating rotary ring member. 4,013,388, Cl. 418-108.000.
Strauss, Richard; Giller, Arnold; Zacharowski, Dieter; and Wiener, Hans, to Hoechst Aktiengesellschaft. Fire-retardant coating composition comprising etherified and non-etherified amino-formaldehyde resin. 4,013,599, Cl. 260-17.300.
Streifer, William: *See—*
Stark, Howard M.; and Streifer, William, 4,014,030.
Strihafka, Alan: *See—*
Burrell, Dale F.; and Strihafka, Alan, 4,013,006.
Strong, William K., to Restaurant Technology, Inc. Continuous method and apparatus for marinating poultry. 4,012,808, Cl. 17-1.00R.
Struewing, Barbara C., administratrix: *See—*
King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,012,801.
Struewing, Francis R., deceased: *See—*
King, John Thomas; Butler, Blondie; and Struewing, Francis R., deceased, 4,012,801.
Stryker, Harvey Irvin, to Du Pont de Nemours, E. I., and Company. Tetraazo direct urea-derived dye having a core of H-acid, K-acid or S-acid. 4,013,634, Cl. 260-167.000.
Stubbs, Joseph Morriss: *See—*
Judge, Francis John; and Stubbs, Joseph Morriss, 4,012,845.
Stupak, Adam E. Governor or similar auto speed control. 4,012,965, Cl. 74-513.000.
Sucreries du Soissonnais et Compagnie Sucriere: *See—*
Anatol, Jesus; and Berecoechea, Jean, 4,013,706.
Suggitt, Robert M.; and Paull, Peter L., to Texaco Inc. Removing metal contaminant from regenerated catalyst in catalytic cracking process. 4,013,546, Cl. 252-415.000.
Suggitt, Robert M.; and Gates, Walter C., Jr., to Texaco Inc. Hydrocarbon upgrading process in secondary alcohol production. 4,013,729, Cl. 260-632.00C.
Sugimoto, Yukio; Okamasa, Makoto; and Fukumura, Toyoshi, to Matsushita Electric Industrial Co., Ltd. Temperature compensating reproducing system. 4,013,845, Cl. 179-100.41R.
Sugiura, Hiroshi: *See—*
Murakami, Masuo; Kawada, Hiroitsu; Ohmura, Tadayoshi; and Sugiura, Hiroshi, 4,013,773.
Sullivan, Kevin J.: *See—*
Rogers, Charles H.; Sullivan, Kevin J.; and Vance, Miles E., 4,013,038.
Sulzbach, Reinhard A.; and Iqbal, Abul F. M., to Monsanto Company. Substituted 1,2-dihydropyridines and process for preparing same. 4,013,661, Cl. 260-283.0CN.
Sumitomo Electric Industries, Ltd.: *See—*
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.
Summa Corporation: *See—*
Hunt, Robert G.; and Edwards, Theodore B., 4,012,989.
Summers, Glen H., to General Electric Company. Terminal block mounting for a plug-in surface heating unit. 4,013,870, Cl. 219-451.000.
Sumoto, Misao: *See—*
Tsuji, Shozo; Minami, Takahisa; and Sumoto, Misao, 4,013,618.
Sunami, Hideo: *See—*
Kamigaki, Yoshiaki; Sunami, Hideo; and Itoh, Yokichi, 4,013,897.
Suntech, Inc.: *See—*
Bushick, Ronald D., 4,013,705.
Surh, Jeong Y.: *See—*
Uram, Robert; Marano, Ross T.; Heiser, Richard S.; and Surh, Jeong Y., 4,013,877.
Suyama, Eizo: *See—*
Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, 4,014,031.
Suzuki, Hideo: *See—*
Kosugi, Yoshitsugu; Suzuki, Hideo; and Kamibayashi, Akira, 4,013,512.
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, to Nippon Telegraph and Telephone Public Corporation; Sumitomo Electric Industries, Ltd.; and Nippon Electric Company, Ltd. Submarine cable laying system. 4,012,918, Cl. 61-107.000.
Suzuki, Naoyuki: *See—*
Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, 4,013,476.
Suzuki, Takashi: *See—*
Ohashi, Koichi; Takahasi, Yuzi; and Suzuki, Takashi, 4,013,615.
Suzuki, Tutomu, to Nippon Gakki Seizo Kabushiki Kaisha. Control circuitry for a voltage-controlled type electronic musical instrument. 4,012,980, Cl. 84-1.010.
Swartz, Martha S.: *See—*
Smeda, Ralph; and Swartz, Martha S., 4,013,294.
Swinehart, Carl F.; and Packer, Herbert, to Harshaw Chemical Company, The. Hot-pressed ionic fluoride optical bodies free of absorption bands and method of making them. 4,013,796, Cl. 423-490.000.
Swodenk, Wolfgang: *See—*
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,013,709.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, 4,013,723.
Sybron Corporation: *See—*
Udart, John Charles, 4,013,892.
Systemation Div. of Koerper Engineering Associates, Inc: *See—*
Putney, Gordon A.; and McCoy, William D., 4,013,807.
Szabo, Gyorgy: *See—*
Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, 4,013,335.
Szekely, Akos: *See—*
Trumble, John H.; Ehlert, Thomas C.; and Szekely, Akos, 4,013,061.
Szente, Pedro Americo, to Hewlett-Packard Company. Apparatus for measuring the incident power of light in fiber optics. 4,012,955, Cl. 73-190.0EW.
Tachikawa, Mitsuji: *See—*
Green, Mitchell V.; Akita, Yukio; and Tachikawa, Mitsuji, 4,013,285.
Tadokoro, Tomoo; and Kawata, Masayuki, to Toyo Kogyo Co., Ltd. Inlet pipe. 4,013,098, Cl. 138-106.000.
Tag Vertrieb A.G.: *See—*
Sebastiani, Enrico, 4,012,936.
Takahashi, Hiroji: *See—*
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.
Takahashi, Takehiko: *See—*
Adachi, Keiji; Gorai, Tokio; Ohami, Kazuaki; Takahashi, Takehiko; and Mizukami, Takayoshi, 4,013,430.
Takahasi, Yuzi: *See—*
Ohashi, Koichi; Takahasi, Yuzi; and Suzuki, Takashi, 4,013,615.
Takai, Katsuyoshi: *See—*
Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, 4,014,031.
Takamitsu, Nagaaki: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,013,727.
Takase, Iwao: *See—*
Kishino, Shigeo; Kudamatsu, Akio; Takase, Iwao; Shiokawa, Kozo; and Yamaguchi, Shin-ichi, 4,013,793.
Takeda Chemical Industries, Ltd.: *See—*
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,013,509.
Kuwada, Yutaka; Meguro, Kanji; Natsugari, Hideaki; Sato, Yoshiaki; and Tawada, Hiroyuki, 4,013,763.
Nose, Yukihiko, 4,013,564.
Tomohiro, Akira; and Kaneko, Kenzo, 4,013,610.
Takematsu, Tetsuo; Konnai, Makoto; Isogawa, Takayuki; and Kodama, Koshiro, to Hodogaya Chemical Co., Ltd. Method of controlling weed growth in a paddy field. 4,013,449, Cl. 71-106.000.
Takeuchi, Mitsuharu; and Otsuki, Akira. Adhesive pit and fissure sealant. 4,012,840, Cl. 32-15.000.

Takeuchi, Yasuo: *See—*
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.

Tamori, Michitoshi: *See—*
Shintani, Sotokichi; Tamori, Michitoshi; and Nagai, Nobuo, 4,013,981.

Tamura, Takaaki, to Kogyo Kaihatus Kenkyusho (Industrial Research Institute). Oxidation catalyst for removal of nitrogen monoxide in exhaust gas. 4,013,588, Cl. 252-454.000.

Tamura, Tooru; Ojima, Nobuyuki; Fondo, Sigeru; and Yozo, Jizodo, to Matsushita Electric Industrial Co., Ltd. Epoxy composition for encasing semiconductor devices. 4,013,612, Cl. 260-37.0EP.

Tanaka, Jinkichi: *See—*
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, 4,013,868.

Tanaka, Shigenobu; Yasuhara, Hikaru; and Oguchi, Munesuke, to Fujikura Cable Works, Ltd., The. Discharge detection system for determining the distance to a dielectric weak point in a cable. 4,013,948, Cl. 324-52.000.

Tanaka, Yukihisa, to Nihon Kaiheiki Industrial Company, Ltd. Illumination-type small-sized switch. 4,013,857, Cl. 200-315.000.

Tanoshima, Katsuhide: *See—*
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, 4,013,004.

Taub, Howard Hyman: *See—*
Lane, Ramon; and Taub, Howard Hyman, 4,014,029.

Tawada, Hiroyuki: *See—*
Kuwada, Yutaka; Meguro, Kanji; Natsugari, Hideaki; Sato, Yoshiaki; and Tawada, Hiroyuki, 4,013,763.

Taylor, Julian S. Gate valve rotating disc. 4,013,090, Cl. 137-329.050.

Taylor, Lionel Ivor. Flowmeter. 4,012,958, Cl. 73-231.00R.

Taylor, R. Daniel, to Adsorbex, Incorporated. Flexible desiccant body. 4,013,566, Cl. 210-502.000.

Teckton, Inc.: *See—*
Goltsos, Costas E., 4,013,798.

Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., to Cosden Technology, Inc. Ethylene-vinyl ester-alkyl vinyl terpolymer emulsions. 4,013,604, Cl. 260-29.6RB.

Teitell, Leonard; and Ross, Sidney H., to United States of America, Army. Wood preservative compositions. 4,013,474, Cl. 106-2.000.

Tekkosha Co., Ltd.: *See—*
Ohashi, Koichi; Takahasi, Yuzi; and Suzuki, Takashi, 4,013,615.

Tektronix, Inc.: *See—*
Reichen, John Erwin; Meyer, Richard Neff; and Reed, Gary William, 4,013,855.

Teleco Inc.: *See—*
Grosso, Donald S., 4,013,945.

Telefonaktiebolaget L M Ericsson: *See—*
Sternbeck, Olaf, 4,013,971.

Teleplex, Inc.: *See—*
Anderson, Scott K., 4,013,840.

Tellie, Paul E., to Etat Francais. Sighting devices for firearms. 4,012,844, Cl. 33-252.000.

Telstop S.A.: *See—*
Bell, Arthur Stewart, 4,013,839.

Temple, Stanley, to Du Pont de Nemours, E. I., and Company. Oil and water repellent polymer containing onium groups. 4,013,627, Cl. 526-245.000.

Tenney, Kenneth S.; and Roby, Michael A., to Rubbermaid Commercial Products, Inc. Fire extinguisher package for waste receptacle. 4,013,127, Cl. 169-57.000.

Tenney, William L. Fuel aerosolization apparatus and method. 4,013,396, Cl. 431-11.000.

Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, to Director-General of the Agency of Industrial Science and Technology. Nitrohumic acid-containing adsorbents and process for producing same. 4,013,585, Cl. 252-427.000.

Texaco Inc.: *See—*
Kablaoui, Mahmoud S.; and Love, Richard F., 4,013,697.
Knifton, John F., 4,013,583.
Knifton, John F., 4,013,584.
Suggitt, Robert M.; and Paull, Peter L., 4,013,546.
Suggitt, Robert M.; and Gates, Walter C., Jr., 4,013,729.

Texaco Trinidad, Inc.: *See—*
Ragoonanan, Dulcie; and Harris, Brian W., 4,013,712.

Texas Instruments Incorporated: *See—*
Caudel, Edward R., 4,014,012.
McElroy, David J., 4,014,013.
Staples, Edward J., 4,013,502.
Williams, Clark R., 4,013,901.

Textron, Inc.: *See—*
Lemos, Walter G., 4,013,206.
Matuschek, Josip, 4,012,984.

Thastrup, Ove: *See—*
Christensen, Gunnar Buhl; and Thastrup, Ove, 4,013,924.

Therm-O-Disc Incorporated: *See—*
Holden, Ronald L., 4,013,988.

Thermology, Inc.: *See—*
Trumble, John H.; Ehlert, Thomas C.; and Szekely, Akos, 4,013,061.

Thettu, Raghulinga R.; and Oszczakiewicz, Michael J., to Xerox Corporation. Cleaning apparatus for a heat and pressure fuser. 4,013,400, Cl. 432-75.000.

Thiery, Jean; Chatard, Michel; Bonavent, Gerard; and Huvey, Michel, to Institut Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Petrolieres Elf. Flexible elongated member comprising a reinforcing armouring. 4,013,100, Cl. 138-129.000.

Thiery, Jean: *See—*
Fabre-Curtat, Michel; and Thiery, Jean, 4,013,205.

Thilo, Peer: *See—*
Siepmann, Bernd Josef; and Thilo, Peer, 4,013,935.

Thiokol Corporation: *See—*
Schneiter, Fred E.; Dykstra, Philip R.; and Kennedy, Carver G., 4,013,010.
Shaw, Graham C.; and Reed, Russell, Jr., 4,013,491.

Thomas, Glyn: *See—*
Powell, Stanley; and Thomas, Glyn, 4,013,782.

Thomas, Michael D.; and Ryder, Francis E., to Ryder International Corporation. Contact lens sterilization process and apparatus. 4,013,410, Cl. 21-58.000.

Thomas, Robert J.: *See—*
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.

Thompson, George W.: *See—*
Deem, Brian C.; Pataky, Gilbert A.; and Thompson, George W., 4,013,954.

Thomson-CSF: *See—*
Hartemann, Pierre, 4,013,983.
Nuzillat, Gerard; and Arnado, Christian, 4,013,483.
Picquendar, Jean-Edgar; and Ngu Tung, Pham, 4,013,896.

Thyssen Aufzuege GmbH.: *See—*
Fromme, Hans-Georg; and Bottner, Gunter, 4,013,015.

Tice, Lee Don; and Drury, David Michael, to Motorola, Inc. Overload protection circuit for voltage regulator. 4,013,925, Cl. 361-18.000.

Tiegel, Ernest G. Method and apparatus for testing battery connector welds. 4,012,947, Cl. 73-101.000.

Tiegel, Ernest G.; and Tiegel, Ralph G., to Tiegel Manufacturing Company. Apparatus for fabricating through-the-wall battery connectors. 4,013,864, Cl. 219-80.000.

Tiegel Manufacturing Company: *See—*
Tiegel, Ernest G.; and Tiegel, Ralph G., 4,013,864.

Tiegel, Ralph G.: *See—*
Tiegel, Ernest G.; and Tiegel, Ralph G., 4,013,864.

Timex Corporation: *See—*
Leibowitz, Marshall, 4,012,831.

Tioxide Group Limited: *See—*
Powell, Stanley; and Thomas, Glyn, 4,013,782.

Tiregon, Inc.: *See—*
Tupper, Myron D., 4,012,973.

Titus, Charles H.: *See—*
Schneider, Harold N.; Titus, Charles H.; and Wittle, J. Kenneth, 4,013,538.

Tojo, Fumiaki, to Kanda Tsushin Kogyo Co., Ltd. Channel-selecting apparatus for a multichannel transceiver. 4,013,957, Cl. 325-25.000.

Tokuda, Kazuo: *See—*
Nishitoba, Shigeo; and Tokuda, Kazuo, 4,013,972.

Tokunaga, Yoshio, to Citizen Watch Co., Ltd. Jig driving apparatus. 4,013,281, Cl. 269-61.000.

Tokyo Broadcasting System, Inc.: *See—*
Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, 4,014,031.

Tokyo Sanyo Electric Co., Ltd.: *See—*
Sakamoto, Jyunji; Imaizumi, Norio; and Shiratani, Eisuke, 4,013,903.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Makino, Shinichi, 4,013,898.
Nagao, Yukio; and Shimada, Masayoshi, 4,013,367.

Tomalia, Donald A.: *See—*
Chumbley, Lewis E.; Sams, Lawrence L., II; McFadden, Russell T.; Longoria, Juan, III; Tomalia, Donald A.; Thomas, Robert J.; and Lalk, James W., 4,013,480.

Tomita, Shigeru: *See—*
Terajima, Kazuki; Tomita, Shigeru; Matsuda, Yoshindo; and Abe, Keiji, 4,013,585.

Tomohiro, Akira; and Kaneko, Kenzo, to Takeda Chemical Industries, Ltd. Sparingly gas-permeable synthetic resin compositions. 4,013,610, Cl. 260-37.0EP.

Tonix Corporation: *See—*
Tsai, Maw-Kuei, 4,013,838.

Topham, Arthur: *See—*
Paget, Hugh Patrick Dryhurst; Rogers, Leslie Richard; Royle, James Kenneth Davenport; Stansfield, James Frederick; and Topham, Arthur, 4,013,687.

Torii, Masao: *See—*
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.

Tornell, Irene: *See—*
Shaffer, Gary W.; Tornell, Irene; and Purzycki, Kenneth L., 4,013,593.

Toscano, Luciano: *See—*
Riva, Mario; Toscano, Luciano; Grisanti, Giampiero; and Bianchetti, Alberto, 4,013,679.

Toshio, Sato: *See—*
Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, 4,013,001.

Toshio, Takaishi: *See—*
Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, 4,013,001.

Tovarna motornih vozil TOMOS: *See—*
Milosevic, Romeo, 4,013,156.

Towlsaver, Inc.: *See—*
Perrin, Jack Louis, 4,013,236.
Perrin, Jack Louis, 4,013,240.
Townson, Thomas: *See—*
Juriss, Ivan Bertram; Hay, Roger Douglas; Goodfellow, Andrew Culross; Townson, Thomas; and Hay, Keith Eric, 4,012,882.
Toyo Kogyo Co., Ltd.: *See—*
Tadokoro, Tomoo; and Kawata, Masayuki, 4,013,098.
Toyo Seikan Kaisha Limited: *See—*
Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, 4,013,001.
Toyo Soda Manufacturing Co., Ltd.: *See—*
Hayashi, Takao; and Shimizu, Akihiko, 4,013,580.
Toyobo Co., Ltd.: *See—*
Tsuji, Shozo; Minami, Takahisa; and Sumoto, Misao, 4,013,618.
Toyota, Hiroshi; Yamazaki, Toshio; and Iketani, Takashi, to Japanese National Railways. Remote railway container locking system. 4,013,017, Cl. 105-366.00C.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Arai, Hiroshi, 4,013,947.
Ichihara, Isao, 4,013,305.
Kuno, Akira; Shinoda, Yoshio; and Arai, Hiroshi, 4,012,948.
Morino, Hideki; Tsuzuki, Isao; and Koshino, Kenji, 4,013,153.
Travaglio, Dalny, to Rogers, Jack. Rotating washer assembly. 4,013,222, Cl. 239-98.000.
Treadwell, Stephen Smith, III, to Recognition Equipment Incorporated. Error detection/correction system. 4,013,997, Cl. 340-146.1AL.
Tress, Norwood E.; and Orsinger, Winston A., to Bell & Howell Company. Pull-foot sheet feeding device. 4,013,283, Cl. 271-14.000.
Tripp, Alan R., to Ventura Product Development Corporation. Dispensing closure. 4,013,200, Cl. 222-534.000.
Trumble, John H.; Ehlert, Thomas C.; and Szekely, Akos, to Thermology, Inc. Ignition system for chemical heaters. 4,013,061, Cl. 126-263.000.
TRW Inc.: *See—*
Behrens, Hermann W.; Grohs, Gerhard L.; and Dailey, Charles L., 4,013,977.
Biess, John; and Yu, Yuan, 4,013,939.
Cone, John A.; Archer, Robert A.; Pacheco, Edward R.; and Peyton, Creath E., 4,014,028.
Tryon, David H. Mold apparatus for forming rings. 4,013,259, Cl. 249-57.000.
Tsai, Maw-Kuei, to Tonix Corporation. Telephonic enquiry system. 4,013,838, Cl. 179-2.00A.
Tsubouchi, Hideo: *See—*
Hattori, Tadashi; Nakase, Takamichi; Tsubouchi, Hideo; and Iwata, Toshiharu, 4,012,906.
Tsuji, Shozo; Minami, Takahisa; and Sumoto, Misao, to Toyobo Co., Ltd. Thermally stabilized polyester-polyether block copolymer composition. 4,013,618, Cl. 260-45.80N.
Tsujimoto, Kazumi N.: *See—*
Cormia, Robert L.; Tsujimoto, Kazumi N.; and Andresen, Sigurd, 4,013,532.
Tsukada, Nobuo: *See—*
Matsuura, Eiichi; and Tsukada, Nobuo, 4,012,899.
Tsukamoto, Shuji: *See—*
Shimazaki, Hideo; Tsukamoto, Shuji; Saito, Tadaomi; Eguchi, Sadanari; and Komata, Yasushi, 4,013,800.
Tsuzuki, Isao: *See—*
Morino, Hideki; Tsuzuki, Isao; and Koshino, Kenji, 4,013,153.
Tucker, John F., to United States of America, Navy. Data acquisition and transfer system. 4,014,002, Cl. 340-168.00B.
Tuckett, Edward G.: *See—*
Wood, Alan F. B.; Rogers, Graham; and Tuckett, Edward G., 4,013,982.
Tupper, Myron D., to Tiregon, Inc. Tire cutting apparatus. 4,012,973, Cl. 82-82.000.
Turek, Alice. Sprayer-wiper device. 4,013,369, Cl. 401-139.000.
Turnbull, John Peter: *See—*
Johnson, Martin Godfrey; Turnbull, John Peter; and Crisp, Harold Alfred, 4,013,680.
Turner, Newton C., Jr., to Genesco, Inc. Forepart insole ring shoe construction. 4,012,853, Cl. 36-17.00R.
Turner, Sam R.; and Stolka, Milan, to Xerox Corporation. Intrachain charge transfer complexes. 4,013,623, Cl. 260-63.0UY.
Turri, Eugenio: *See—*
Calamani, Sergio; Turri, Eugenio; and Savio, Ermanno, 4,013,238.
Twin Disc, Incorporated: *See—*
Dundore, Marvin W., 4,012,908.
Tyrone Hydraulics, Inc.: *See—*
McBurnett, James R., 4,013,138.
Tyssee, Donald Armon, to Monsanto Company. Electrolytic carboxylation and dimerization of olefins. 4,013,524, Cl. 204-59.00R.
Ubank, Raymond George: *See—*
Wildgoose, Paul; and Ubank, Raymond George, 4,013,424.
UBE Industries, Ltd.: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,013,727.
Uchiike, Hisayuki: *See—*
Kataoka, Koji; and Uchiike, Hisayuki, 4,013,975.
Uchino, Hayashi: *See—*
Nagoshi, Fumiya; Arakawa, Hideyuki; Uchino, Hayashi; Echigoya, Mitsuru; and Matsuo, Masaki, 4,013,608.
Udart, John Charles, to Sybron Corporation. IR Generator having ellipsoidal and paraboloidal reflectors. 4,013,892, Cl. 250-504.000.
Ueda, Harutoshi; Suzuki, Naoyuki; and Nagao, Masami, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Non-combustible molding material. 4,013,476, Cl. 106-15.0FP.
Ueda, Hirotada: *See—*
Uno, Takeshi; Ikeda, Sadahiro; and Ueda, Hirotada, 4,014,000.
Uhl, Karl: *See—*
Schoettle, Klaus; Wittkamp, Heinrich; Uhl, Karl; and Rotter, Gerhard, 4,014,042.
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, to UBE Industries, Ltd. Process for preparing hydroxyphenyl ethers. 4,013,727, Cl. 260-613.00R.
Umezawa, Kazumi: *See—*
Komori, Shigehiro; Sakamaki, Hisashi; Hattori, Hiroyuki; Iida, Toshihide; Miyamoto, Koichi; and Umezawa, Kazumi, 4,013,354.
Union Camp Corporation: *See—*
Giebel, Buddy E., 4,013,213.
Union Carbide Corporation: *See—*
Brown, Charles M.; and Brown, Harry J., 4,013,460.
Cawse, James N., 4,013,700.
Elbert, Raymond John, 4,013,461.
Engel, Stephen August, 4,013,486.
Somekh, George S., 4,013,640.
Union Oil Company of California: *See—*
Fischer, Paul W.; Jones, Jerry C., deceased; Pyle, Delbert E.; and Pye, Stephen, 4,013,568.
Mickelson, Grant A., 4,013,547.
United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Clapham, Peter Brian; and Hutley, Michael Christopher, 4,013,465.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the: *See—*
Hayward, Alan Thomas Joseph, 4,012,939.
United States of America
Agriculture: *See—*
Stewart, Kent K.; Beecher, Gary R.; and Hare, Peter Edgar, 4,013,413.
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,013,493.
Air Force: *See—*
Davis, Dale M., 4,013,013.
Army: *See—*
Burkhalter, John E.; and Sforzini, Richard H., 4,012,987.
Einberg, Fred J., 4,013,596.
Falls, Robert A., 4,013,950.
Knight, Frederick W., 4,012,988.
Teitell, Leonard; and Ross, Sidney H., 4,013,474.
Environmental Protection Agency: *See—*
Vrolyk, Johr J.; and Melvold, Robert W., 4,012,822.
Navy: *See—*
Barrett, Carl R., Jr.; and Goldstein, Abe, 4,014,020.
Benya, John A.; and McGuffey, Gale W., 4,013,944.
Campbell, Kenneth J., 4,013,966.
Dewberry, Larry F.; Banks, Robert H.; and Dildy, Clell A., 4,013,992.
Fassbind, Frank A., 4,013,967.
Fetter, Richard W., 4,014,019.
Routson, Willis G., 4,013,272.
Tucker, John F., 4,014,002.
Vanbuskirk, Lyman F., 4,013,245.
Wagner, Peter B., 4,013,955.
Weinberg, Leonard, 4,014,022.
Willard, Charles M., 4,013,226.
U.S. Philips Corporation: *See—*
Bescond, Francois Joseph Marie, 4,013,344.
Dornaus, Johannes; Lahmer, Jurgen; and Refflinghaus, Bernd, 4,013,956.
Lebailly, Jacques, 4,013,918.
Roger, Bernard; Ayel, Michel; and Debar, Francis, 4,013,337.
van de Plassche, Rudy Johan, 4,013,973.
van der Meulen, Andries, 4,013,922.
Van Der Steen, Gerardus Henricus Antonius Maria, 4,013,436.
van Osenbruggen, Cornelis; van Ruler, Johannes; and Schoenmakers, Theodorus Maria Berendina, 4,013,863.
Wagner, Wolfgang, 4,013,878.
Wellinga, Kobus; and Mulder, Rudolf, 4,013,717.
United States Steel Corporation: *See—*
Patsey, John A., 4,012,946.
Weil, Richard C., 4,013,550.
United Technologies Corporation: *See—*
Bisson, Bernard Joseph; and White, Loren Hawdon, 4,013,376.
Universal Manufacturing Corporation: *See—*
Miller, Imrich M., 4,013,212.
Universal Maschinenfabrik Dr. Rudolf Schieber KG: *See—*
Kuhnert, Gottfried, 4,012,927.
Universal Oil Products Company: *See—*
Ward, Dennis J., 4,013,737.
University of Utah, The: *See—*
Jatkar, Arun D.; Cutler, Ivan B.; Virkar, Anil V.; and Gordon, Ronald S., 4,013,477.
Vali, Victor; Shorthill, Richard W.; Goldstein, Raymond; and Krogstad, Reuben S., 4,013,365.
Uno, Takeshi; Ikeda, Sadahiro; and Ueda, Hirotada, to Hitachi, Ltd.

Pattern recognition system utilizing a plurality of partial standard patterns. 4,014,000, Cl. 340-146.3MA.

Unwin, Arthur H.: *See—*
Joss, Roger V.; Semonchik, William; and Unwin, Arthur H., 4,013,856.

UOP Inc.: *See—*
Antos, George J.; Hayes, John C.; and Pollitzer, Ernest L., 4,013,735.
Evans, Thomas W., 4,013,556.
Hilfman, Lee, 4,013,545.
Pollitzer, Ernest L.; and Hayes, John C., 4,013,548.
Pollitzer, Ernest L.; and Hayes, John C., 4,013,738.
Rausch, Richard E., 4,013,733.

Upjohn Company, The: *See—*
Babcock, John C.; and Campbell, J. Allan, 4,013,688.
Lin, Chiu-Hong, 4,013,695.
Morozowich, Walter, 4,013,693.
Morozowich, Walter, 4,013,707.

Uram, Robert; Marano, Ross T.; Heiser, Richard S.; and Surh, Jeong Y., to Westinghouse Electric Corporation. Combined cycle electric power plant with a steam turbine having an improved valve control system. 4,013,877, Cl. 235-151.210.

Uraneck, Carl A.; and Burleigh, John E., to Phillips Petroleum Company. Mixing of organosulfur molecular weight modifier with emulsifier in presence of monomer or diluent. 4,013,824, Cl. 526-205.000.

Utsunomiya, Tadashi: *See—*
Masuda, Kinji; Saigo, Hideaki; Naito, Kazuo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,013,817.

Uuskallio, Arvo Foster, to Briggs & Stratton Corporation. Spilled fuel diverter for small engines. 4,013,105, Cl. 141-86.000.

Uyeda, Tim M., to Gartner, Klaus W. Key decoding and duplicating apparatus and method. 4,012,991, Cl. 90-13.050.

VAC-U-MAX: *See—*
Pendleton, Frank P., 4,013,321.

Vale, William Henry, to Scientific and Applied Processes Pty., Ltd. Nitrogenous fertilizers. 4,013,440, Cl. 71-24.000.

Vali, Victor; Shorthill, Richard W.; Goldstein, Raymond; and Krogstad, Reuben S., to University of Utah, The. Laser gyroscope. 4,013,365, Cl. 356-106.0LR.

Valyi, Emery I. Method for making composite plastic article. 4,013,748, Cl. 264-90.000.

Van Besauw, Jan Frans: *See—*
Willems, Jozef Frans; Poot, Albert Lucien; Van Besauw, Jan Frans; Klein, Alfons; and Wedemeyer, Karlfried, 4,013,473.

Vanbuskirk, Lyman F., to United States of America, Navy. Homing projectile. 4,013,245, Cl. 244-3.160.

Vance, Miles E.: *See—*
Rogers, Charles H.; Sullivan, Kevin J.; and Vance, Miles E., 4,013,038.

Vandebult, Jan: *See—*
Martens, Henry J.; and Vandebult, Jan, 4,012,813.

van de Plassche, Rudy Johan, to U.S. Philips Corporation. Amplifier arrangement. 4,013,973, Cl. 330-30.00D.

Vandeputte, Camille Angelina: *See—*
Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, 4,013,471.

Vander Laan, John S., III: *See—*
Fabre, Brian K.; and Vander Laan, John S., III, 4,013,149.

van der Meulen, Andries, to U.S. Philips Corporation. Sunlamp device. 4,013,922, Cl. 315-362.000.

Van Der Steen, Gerardus Henricus Antonius Maria, to U.S. Philips Corporation. Method for the production of objects of quartz-glass by drawing. 4,013,436, Cl. 65-32.000.

Vanni, Umberto: *See—*
Burlamacchi, Pio; Pratesi, Riccardo; and Vanni, Umberto, 4,013,978.

van Osenbruggen, Cornelis; van Ruler, Johannes; and Schoenmakers, Theodorus Maria Berendina, to U.S. Philips Corporation. Method of finishing a workpiece of a non-conducting material, particularly diamond, by means of spark erosion. 4,013,863, Cl. 219-69.00D.

Vanreusel, Gerard Laurens: *See—*
Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, 4,013,471.

van Ruler, Johannes: *See—*
van Osenbruggen, Cornelis; van Ruler, Johannes; and Schoenmakers, Theodorus Maria Berendina, 4,013,863.

Van Uitert, Le Grand Gerard; and Zydzik, George John, to Bell Telephone Laboratories, Incorporated. Growth of neodymium doped yttrium aluminum garnet crystals. 4,013,501, Cl. 156-605.000.

van Veelen, George Frans: *See—*
Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, 4,013,471.

Van Veldhoven, George E. Aerosol can nozzle and cap assembly. 4,013,231, Cl. 239-579.000.

Varian Associates: *See—*
Schott, Charles M., Jr.; and Ryding, Geoffrey, 4,013,262.

Varkonyi, Laszlo; Szabo, Gyorgy; Orto, Jozsef; Nagy, Laszlo; Spielmann, Janos; Rabatin, Gyorgy; and Pozsonyi, Istvan, to Egyesult Izzolampa Es. Villamossagi Resveny tarsasag. Lamp caps for halogen lamps and the like. 4,013,335, Cl. 339-144.00R.

Varlerberghe, Guy; and Sebag, Henri, to Societe Anonyme dite: L'Oreal. Piperazine based polymer and hair treating composition containing the same. 4,013,787, Cl. 424-70.000.

Varta Batteries Limited: *See—*
Grabb, Nicholas G., 4,013,819.

Vashkevich, Vyacheslav Andreevich: *See—*
Burov, Igor Sergeevich; Bysjuk, Vladimir Vladimirovich; Mosse, Alfred Lvovich; Shkurko, Leonid Stepanovich; and Vashkevich, Vyacheslav Andreevich, 4,013,415.

Veda, Inc.: *See—*
Carter, Thomas M., 4,013,224.

Vega Industries, Inc.: *See—*
Andrews, George M., 4,013,059.

Venditti, Arthur P.: *See—*
Brass, Robert L.; Venditti, Arthur P.; and Kjellman, Samuel T., 4,013,291.

Ventura Product Development Corporation: *See—*
Tripp, Alan R., 4,013,200.

Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See—*
Granitz, Fritz; Robiczek, Gunther; Jabkowski, Fridolin; and Stoger, Franz, 4,012,825.

Verspui, Gerrit: *See—*
Knippenberg, Wilhelmus Franciscus; and Verspui, Gerrit, 4,013,503.

Vesel, Andrew M., to Cessna Aircraft Company, The. Scalloping suppression system and method. 4,014,025, Cl. 343-106.00R.

Vetsch, LeRoy E.: *See—*
Chiles, William E.; Vetsch, LeRoy E.; and Peterson, Jack V., 4,012,957.

Vi-Amino Feeds, Inc.: *See—*
Olson, Eldred, 4,013,873.

Vidakovic, Aleksandar, to International Harvester Company. Anchor plate tire having a sub-lug equipped anchor plate. 4,013,112, Cl. 152-182.000.

Villanova University: *See—*
Shupack, Saul I.; and Malin, Stephen F., 4,013,411.

Villari, Frank K.: *See—*
Patel, Bhupendra C.; and Villari, Frank K., 4,013,064.

Vinyl-Chem International, Inc.: *See—*
Golumbic, Harvey J., 4,013,495.

Virkar, Anil V.: *See—*
Jatkar, Arun D.; Cutler, Ivan B.; Virkar, Anil V.; and Gordon, Ronald S., 4,013,477.

Virr, Michael John, to Fluidfire Development Limited. Treatment furnace. 4,013,279, Cl. 266-249.000.

Vis, Larry J.: *See—*
Hansen, Roger P.; and Vis, Larry J., 4,013,214.

Vit, Jaroslav, to National Patent Development Corporation. Dental treatment method and apparatus. 4,012,842, Cl. 32-58.000.

Vitatelt Corporation: *See—*
Plakas, Chris J., 4,013,418.

Vittoz, Eric, to Centre Electronique Horloger S.A. CMOS oscillator with first and second MOS transistors of opposed type integrated on the same substrate. 4,013,979, Cl. 331-108.00B.

Viviano, Anthony V. L. Apparatus to control jib. 4,013,031, Cl. 114-204.000.

Vlk, Petr, to British Hartford-Fairmont Limited. Gob forming apparatus. 4,013,439, Cl. 65-330.000.

Volkert, Otto; Wigger, August; Zuerger, Manfred; and Richter, Peter, to BASF Aktiengesellschaft. Manufacture of thin layers of polyurethane elastomers. 4,013,806, Cl. 427-54.000.

Vollmer, Rudolf: *See—*
Gocke, Eberhard; and Vollmer, Rudolf, 4,013,088.

Volvo Flygmotor Aktiebolag: *See—*
Malmros, Sten Axel Torby, 4,012,994.

von Podewils-Schoeller, Christina, heiress: *See—*
Schoeller, Alexander, deceased; and von Podewils-Schoeller, Christina, heiress, 4,013,020.

Von Strandtmann, Max: *See—*
Connor, David T.; Young, Patricia; and Von Strandtmann, Max, 4,013,673.

von Sturm, Ferdinand: *See—*
Nischik, Herbert; and von Sturm, Ferdinand, 4,013,522.

Vrolyk, John J.; and Melvold, Robert W., to United States of America, Environmental Protection Agency. System for sealing and repairing leaks in ruptured containers. 4,012,822, Cl. 29-700.000.

Vyzkumny ustav Bavinarsky: *See—*
Burysek, Frantisek; Mikulecky, Karel; and Havranek, Zdenek, 4,013,242.

Vyzkumny ustav papieru a celulosy: *See—*
Balcar, Cestmir; Kostka, Antonin; Havranek, Jaroslav; and Lalak, Marcel, 4,013,505.

W. A. Whitney Corporation: *See—*
Brolund, Theodore F., 4,012,976.

W. Haking Industries, Ltd.: *See—*
Chan, Kwok Yan, 4,014,033.

Wacker-Chemie GmbH: *See—*
Hechtl, Wolfgang; Wohlfarth, Ernst; and Strasser, Alois, 4,013,611.

Wade Industries, Inc.: *See—*
Black, Stanley D., 4,012,812.

Wafer, John A., to Westinghouse Electric Corporation. Current limiting circuit breaker. 4,013,984, Cl. 335-185.000.

Wafer, John A.: *See—*
Lang, Walter W.; Wafer, John A.; Bratkowski, Walter V.; and Bhate, Suresh K., 4,013,926.

Wagner, Andre, to Regie Nationale des Usines Renault. Device for trimming and bevelling gear teeth. 4,012,990, Cl. 90-1.400.

Wagner Electric Corporation: *See*—
Quon, Donald S., 4,013,324.
Wagner, Kuno; and Dahm, Manfred, to Bayer Aktiengesellschaft. Process for the linearization of polyurethanes with lactams and lactam addition compounds. 4,013,625, Cl. 260-77.5AA.
Wagner, Peter B., to United States of America, Navy. Analog signal processor. 4,013,955, Cl. 324-72.000.
Wagner, Wolfgang, to U.S. Philips Corporation. Device for an iterative determination of the variation of a function in a plane. 4,013,878, Cl. 235-151.350.
Wahlen, Werner: *See*—
Steiger, Ferdinand; and Wahlen, Werner, 4,013,107.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, to Bayer Aktiengesellschaft. Production of ω-formyl carboxylic acid esters. 4,013,709, Cl. 260-483.000.
Waldmann, Helmut; Schwerdtel, Wulf; and Swodenk, Wolfgang, to Bayer Aktiengesellschaft. Process for preparing aldehydes. 4,013,723, Cl. 260-601.00R.
Waldrop, Joseph R.: *See*—
Sarinopoulos, George A.; McCarthy, Robert E.; and Waldrop, Joseph R., 4,013,928.
Wallace, Preston A. Air conditioner control system. 4,013,119, Cl. 165-27.000.
Wallace, Richard A. Mixed polymeric structural material and method. 4,013,616, Cl. 260-42.460.
Wallberg, Eric Vilhelm: *See*—
Johansson, Lennart Johan Ivar; Wallberg, Eric Vilhelm; and Lindqvist, Bjorn Weine, 4,012,859.
Wallick, Charles W., to Du Pont de Nemours, E. I., and Company. Method of forming a dual in-line package. 4,012,835, Cl. 29-591.000.
Walsh, Ralph: *See*—
Laky, Elmer; and Walsh, Ralph, 4,013,270.
Walter, Florian A.; and Stewart, Edward C. Shelving apparatus. 4,013,022, Cl. 108-114.000.
Walter Kidde & Company, Inc.: *See*—
Davis, Robert F., 4,013,128.
Walter, Lothar: *See*—
Kunkel, Heinrich; Olschewski, Armin; Walter, Lothar; Schurger, Rainer; Brandenstein, Manfred; and Burkl, Erich, 4,013,327.
Ward, Dennis J., to Universal Oil Products Company. Upgrading synthetic gasoline. 4,013,737, Cl. 260-683.200.
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., to United States of America, Agriculture. Process for etching glass or ceramic surface. 4,013,493, Cl. 156-654.000.
Ward, William J.; and Gasper, Kenneth E., to Olin Corporation. Chlorine dioxide generation. 4,013,761, Cl. 423-477.000.
Warncke, Niels; and Johst, Wolfgang, to Dr. Carl Hahn GmbH. Method and apparatus for attaching the free end of a withdrawing tape to a tampon roll. 4,012,809, Cl. 19-144.500.
Warner-Lambert Company: *See*—
Brown, Richard E., 4,013,660.
Brown, Richard E.; and Shavel, John, Jr., 4,013,671.
Brown, Richard E.; and Lustgarten, David M., 4,013,771.
Connor, David T.; Young, Patricia; and Von Strandtmann, Max, 4,013,673.
Eichman, Martin L.; and Belsole, Susan C., 4,013,792.
Morrison, Glenn C.; and Cetenko, Wiaczeslaw A., 4,013,778.
Zinnes, Harold; and Lindo, Neil A., 4,013,686.
Warner, Paul F., to Phillips Petroleum Company. Synthesis of a dithiol from 1-methyl-2-(2-hydroxyethylthio)-4-[1-methyl-2-(2-hydroxyethylthio)ethyl]cyclohexane. 4,013,724, Cl. 260-609.00D.
Warning, Walter B., Jr.: *See*—
Warning, Walter B., Sr.; and Warning, Walter B., Jr., 4,013,037.
Warning, Walter B., Sr.; and Warning, Walter B., Jr., to Airprint Systems, Inc. Apparatus for controllably applying liquids to a moving surface. 4,013,037, Cl. 118-2.000.
Warren, George D.: *See*—
Teer, Glenn E.; Higgins, Jerry G.; and Warren, George D., 4,013,604.
Warren, William H. Adjustable drive rod system. 4,012,967, Cl. 74-586.000.
Wasielewski, Richard J.: *See*—
Cummisford, Robert G.; Wasielewski, Richard J.; and Krueger, Robert K., 4,013,629.
Watanabe, Akinori; Tanoshima, Katsuhide; and Noguchi, Matsusaburo, to Oki Electric Industry Company, Ltd. Ink mist type high speed printer. 4,013,004, Cl. 101-1.000.
Watanabe, Itaru: *See*—
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, 4,013,868.
Watson, Dean A.: *See*—
McClatchie, Edward A.; Watson, Dean A.; and Burough, Irvin G., 4,013,260.
Watt, David M., Jr.: *See*—
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,573.
Leikhim, John W.; Maguire, Edward J., Jr.; Heckert, David C.; and Watt, David M., Jr., 4,013,574.
Weady, Andrew A.; and Denz, Jerome T., to Hydraulic Drives, Inc. Hydraulic driven pulley for conveyors. 4,013,166, Cl. 198-835.000.
Webber, Barry Bruce: *See*—
Rager, Edgar Avinell; and Webber, Barry Bruce, 4,013,492.
Weber, Kurt, to Rieter Machine Works, Ltd. Method of loading transporting trolleys with full cans or the like and supplying full cans to spinning machines fed with fiber sliver and apparatus for implementing the method. 4,012,893, Cl. 57-34.00R.
Weber, Kurt; and Luthi, Christian, to Ciba-Geigy Corporation. Diarylvinyl-dihydrophenanthrene compounds. 4,013,713, Cl. 260-505.00R.
Weckenmann, Albert, to Robert Bosch G.m.b.H. Inductive transducer for rectilinear or rotational displacement. 4,013,986, Cl. 336-75.000.
Wedemeyer, Karlfried: *See*—
Willems, Jozef Frans; Poot, Albert Lucien; Van Besauw, Jan Frans; Klein, Alfons; and Wedemeyer, Karlfried, 4,013,473.
Weeks, Lloyd E.: *See*—
Wildi, Bernard S.; and Weeks, Lloyd E., 4,013,514.
Weghaupt, Erich, to Kraftwerk Union Aktiengesellschaft. Cooling system for a superconductive exciter winding. 4,013,908, Cl. 310-61.000.
Wehnelt, Ulrich: *See*—
Preissinger, Karl-Heinz; and Wehnelt, Ulrich, 4,012,817.
Wehner, Karl Heinz, to Klockner-Werke AG. Mine roof support. 4,012,914, Cl. 61-45.00D.
Weidemann, Dieter: *See*—
Reidelbach, Willi; Grach, Herbert; Lutze, Hans; and Weidemann, Dieter, 4,013,317.
Weidenbach, Guenter: *See*—
Fischer, Hermann; Schindler, Hubert; Kuhrt, Winfried; and Weidenbach, Guenter, 4,013,587.
Weidkuhn, Gert: *See*—
Bestenreiner, Friedrich; Giglberger, Dieter; and Weidkuhn, Gert, 4,013,356.
Weil, Edward D., to Stauffer Chemical Company. Poly(haloethyl-ethyleneoxy) phosphoric acid ester polymers. 4,013,814, Cl. 428-277.000.
Weil, Ludwig: *See*—
Reis, August; Quentin, Karl-Ernst; and Weil, Ludwig, 4,013,554.
Weil, Richard C., to United States Steel Corporation. Manufacture of thermoplastic resin beads. 4,013,550, Cl. 209-9.000.
Weiler, Raoul; Leuridan, Joel; and Renier, Jozef, to Bayer Antwerpen N.V. Filtration of solid-containing titanyl sulfate solutions. 4,013,755, Cl. 423-82.000.
Weiler, Walter K. F.; and Passavant, Rudolf C., to Passavant-Werke Michelbacher Hutte. Cover for manhole structures. 4,013,374, Cl. 404-25.000.
Weinberg, Leonard, to United States of America, Navy. Target detection method and apparatus for reducing range-smearing error caused by relative target motion. 4,014,022, Cl. 343-13.00R.
Weinle, Werner: *See*—
Kuerten, Heribert; Nagel, Otto; Sinn, Richard; Weinle, Werner; and Engler, Peter, 4,013,744.
Weintraub, Leonard; and Rosenberg, Allan H., to Bristol-Myers Company. APAP tablet containing fumed silica and process for manufacturing same. 4,013,785, Cl. 424-23.000.
Weisman, Sidney; and Cotter, Robert F., to Howmedica, Inc. Interpositioning collar for prosthetic bone insert. 4,012,796, Cl. 3-1.910.
Weissman, Richard M.: *See*—
Britz, John A.; and Weissman, Richard M., 4,013,157.
Welch Allyn, Inc.: *See*—
Hertig, Urs W., 4,013,893.
Wellinga, Kobus; and Mulder, Rudolf, to U.S. Philips Corporation. Benzoyl phenyl urea derivatives having insecticidal activities. 4,013,717, Cl. 260-553.00E.
Welsch, Georg: *See*—
Lamprecht, Horst; and Welsch, Georg, 4,013,373.
Wemekamp, Henry, to Computeacher Limited. Music teaching apparatus. 4,012,979, Cl. 84-1.010.
Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See*—
Ewertowski, Norbert, 4,012,830.
Werner & Mertz GmbH: *See*—
Schneider, Helmut, 4,012,805.
Werner, Wolfgang: *See*—
Rittersdorf, Walter; Guthlein, Werner; Werner, Wolfgang; Rey, Hanz-Georg; and Rieckmann, Peter, 4,013,416.
Wesley-Jessen Inc.: *See*—
Loshaek, Samuel, 4,013,576.
West, George L. Rain curtain assembly for golf carts. 4,013,315, Cl. 296-83.000.
Westermann, Albert; Zimmermann, Frank; Wuppermann, Dirk; Friedrich, Ludwig; and Raschack, Manfred, to Knoll A.G. Chemische Fabriken. Isoquinoline compounds. 4,013,663, Cl. 260-287.00D.
Western Electric Company, Inc.: *See*—
Klaiber, Robert James, 4,013,466.
Westfall, John Lloyd, to Frymaster Corporation, The. Microwave oven door seal. 4,013,861, Cl. 219-10.55D.
Westheider, Heinz: *See*—
Piontek, Gunter; Firlay, Heinz; and Westheider, Heinz, 4,013,180.
Westinghouse Air Brake Company: *See*—
Burkett, Richard O., 4,013,323.
Worbois, Robert J.; and Reiss, John R., 4,013,322.
Westinghouse Electric Corporation: *See*—
Alverson, Thomas E.; Soles, Otto H.; Hopkins, Melvyn D.; and LeRow, Charles E., Jr., 4,013,853.
Amos, David J., 4,013,377.
Born, William F., 4,013,989.
Boundy, Bruce K.; and Munsey, Robert J., 4,013,254.
Chick, Raymond F., 4,013,904.
Comstock, Douglas K., 4,014,026.
Fey, Maurice G., 4,013,867.
Foster, Newton C., 4,013,987.
Guidosh, Edward F., 4,013,847.
Hagg, Arthur C., 4,013,142.

Kirschbaum, Herbert S., 4,012,920.
Lang, Walter W.; Wafer, John A.; Bratkowski, Walter V.; and Bhate, Suresh K., 4,013,926.
Mandel, Alan F.; Frask, Theodore E.; and Bedel, Denis E., 4,013,993.
Owen, Edward A., 4,013,217.
Pelly, Brian R.; and Gyugyi, Laszlo, 4,013,937.
Petro, John, 4,013,920.
Ryan, Frederick M.; and Miller, Robert C., 4,013,490.
Uram, Robert; Marano, Ross T.; Heiser, Richard S.; and Surh, Jeong Y., 4,013,877.
Wafer, John A., 4,013,984.

Westvaco Corporation: *See*—
Alford, John A., 4,013,601.

Weyerhaeuser Company: *See*—
Ingold, Lester Donald, 4,013,042.

Whirlpool Corporation: *See*—
Bratton, William Lee, 4,013,185.

White, Donald Elias, to B. F. Goodrich Company, The. Electrolyte separator tensioning device. 4,013,535, Cl. 204-252.000.

White, Donald Elias, to B. F. Goodrich Company, The. Electrolytic cell design. 4,013,537, Cl. 204-256.000.

White, Loren Hawdon: *See*—
Bisson, Bernard Joseph; and White, Loren Hawdon, 4,013,376.

Wico Corporation: *See*—
Geller, David, 4,013,930.

Wieden, Horst: *See*—
Lohwasser, Hermann; Nagaj, Alfred; and Wieden, Horst, 4,013,753.

Wiener, Hans: *See*—
Strauss, Richard; Giller, Arnold; Zacharowski, Dieter; and Wiener, Hans, 4,013,599.

Wiest, Peter P.: *See*—
Lindemann, Hans-Joachim; and Wiest, Peter P., 4,013,079.

Wigger, August: *See*—
Volkert, Otto; Wigger, August; Zuerger, Manfred; and Richter, Peter, 4,013,806.

Wiggins, Edwin W.; and Malmberg, Quentin C., to McDonnell Douglas Corporation. Flame arresting and explosion attenuating system. 4,013,190, Cl. 220-22.000.

Wild Heerbrugg Aktiengesellschaft: *See*—
Bertele, Ludwig; and Hildebrand, Klaus W., 4,013,349.

Wildgoose, Paul; and Ubank, Raymond George, to Rolls-Royce (1971) Limited. Composite articles. 4,013,424, Cl. 29-194.000.

Wildi, Bernard S.; and Weeks, Lloyd E., to Monsanto Company. Preparing a reactor containing enzymes attached to dialdehyde cellulose. 4,013,514, Cl. 195-68.000.

Wilkinson, John R., to International Harvester Company. Ripper for attachment to tractor. 4,013,129, Cl. 172-464.000.

Willard, Charles M., to United States of America, Navy. Variable jet nozzle with balanced two-dimensional blocker flap. 4,013,226, Cl. 239-265.290.

Willems, Jozef Frans; Poot, Albert Lucien; Van Besauw, Jan Frans; Klein, Alfons; and Wedemeyer, Karlfried, to AGFA-GEVAERT N.V. Recording materials and image receiving materials for producing copies in a dry way. 4,013,473, Cl. 96-114.100.

Willems, Jozef Frans: *See*—
Pollet, Robert Joseph; Vandeputte, Camille Angelina; Sels, Francis Jeanne; Vanreusel, Gerard Laurens; Willems, Jozef Frans; and van Veelen, George Frans, 4,013,471.

Willets, Elwood H. Railroad car truck suspension system. 4,013,016, Cl. 105-199.00R.

Williams, Clark R., to Texas Instruments Incorporated. Stacked logic design for I^2L watch. 4,013,901, Cl. 307-296.000.

Williams, Hugh M. Variable pitch vehicle wheel support ramp. 4,013,268, Cl. 254-88.000.

Williams, Philip David Lane; and Cramp, Harry Donald, to Decca Limited. Pulse radar apparatus. 4,014,018, Cl. 343-5.0VQ.

Williams, Ralph P.; and Louthan, Rector P., to Phillips Petroleum Company. Extreme pressure lubricating composition containing thiosulfinate extreme pressure agents. 4,013,571, Cl. 252-42.000.

Williams, Robert C., to GTE Information Systems Incorporated. Data transmission and display system. 4,013,836, Cl. 178-58.00R.

Willinger, Karl, to Hans Ehgartner, Firma. Cylindrical abrading tool. 4,012,819, Cl. 29-79.000.

Willitts, Benjamin R.; and Klossman, Charles W., to Emhart Industries, Inc. Refrigeration and hot gas defrost system. 4,012,921, Cl. 62-151.000.

Wilson, Edward McKenzie; and Curran, Adrian Charles Ward, to Glaxo Laboratories Limited. Formamido cephalosporin compounds. 4,013,645, Cl. 260-243.00C.

Wingaersheek, Inc.: *See*—
Wormser, Alex F., 4,013,395.

Wirt, Leon A.; and Rhoads, Kenneth A., to Caterpillar Tractor Co. Ripper tip assembly. 4,013,130, Cl. 172-719.000.

Wise, Boyd A., to Hydroacoustics Inc. Tunneling machine with massive guide for impact tools. 4,013,319, Cl. 299-31.000.

Wissmann, Hans; Geiger, Rolf; Lindner, Ernst; and Scholkens, Bernward, to Hoechst Aktiengeselischaft. Peptides having an antihypertensive effect. 4,013,791, Cl. 424-177.000.

Witkin, Donald E.; and Bowles, Arnold G., to National Forge Company. Hot isostatic press system. 4,013,394, Cl. 425-405.00H.

Wittkamp, Heinrich: *See*—
Schoettle, Klaus; Wittkamp, Heinrich; Uhl, Karl; and Rotter, Gerhard, 4,014,042.

Wittle, J. Kenneth: *See*—
Schneider, Harold N.; Titus, Charles H.; and Wittle, J. Kenneth, 4,013,538.

Wixon, Harold Eugene, to Colgate-Palmolive Company. Heavy duty dry biodegradable detergent composition. 4,013,577, Cl. 252-109.000.

Wohlfarth, Ernst: *See*—
Hechtl, Wolfgang; Wohlfarth, Ernst; and Strasser, Alois, 4,013,611.

Wojik, Karl: *See*—
Hafner, Reinhard; Wojik, Karl; and Schlenker, Gerhard, 4,013,058.

Wolf, Hugo M.; and Wolf, Leo H. Cabinet structure for dental treatment room. 4,013,328, Cl. 312-209.000.

Wolf, Karlheinz: *See*—
Molls, Hans-Heinz; Wolf, Karlheinz; Hornle, Reinhold; Popp, Gottfried; Nonn, Konrad; and Spille, Jurgen, 4,013,481.

Wolf, Leo H.: *See*—
Wolf, Hugo M.; and Wolf, Leo H., 4,013,328.

Wolf, William D., to Monsanto Company. Method and apparatus for delabeling. 4,013,497, Cl. 156-154.000.

Wolfe, Saul, to Queen's University at Kingston. 1-Oxacephems. 4,013,653, Cl. 260-244.00R.

Wolfman, Norman S.: *See*—
Hardman, James V.; and Wolfman, Norman S., 4,013,386.

Wolfrum, Gerhard; and Gold, Heinrich, to Bayer Aktiengesellschaft. Monoazo dyestuffs containing an N-β-1,2,3-triazolylethyl anilino coupling component. 4,013,631, Cl. 260-157.000.

Wollweber, Hartmund; and Flucke, Winfried, to Bayer Aktiengesellschaft. Aminophenylamidines, their production and their pharmaceutical use. 4,013,676, Cl. 260-307.00H.

Woo, Charles, to Exxon Research and Engineering Company. Synthesis of low viscosity low pour point hydrocarbon lubricating oils. 4,013,736, Cl. 260-676.00R.

Wood, Alan F. B.; Rogers, Graham; and Tuckett, Edward G., to International Standard Electric Corporation. Piezoelectric crystal unit. 4,013,982, Cl. 333-72.000.

Woolf, Jerome: *See*—
Kubilius, Fabian; Pavlovic, Gary Frank; and Woolf, Jerome, 4,013,039.

Worbois, Robert J.; and Reiss, John R., to Westinghouse Air Brake Company. Brake apparatus providing permanent suppression of a train control brake application. 4,013,322, Cl. 303-18.000.

Workman, Lester J. Coaxial switch. 4,013,854, Cl. 200-153.00S.

World Oil Mining Ltd.: *See*—
Johns, Robert W., 4,013,320.

Wormser, Alex F., to Wingaersheek, Inc. Aerodynamic fuel combustor. 4,013,395, Cl. 431-9.000.

Wright, Charles E. Dental cleaning means and method of manufacture therefor. 4,013,085, Cl. 132-89.000.

Wunsch, Gerd: *See*—
Adolphi, Heinrich; Wunsch, Gerd; and Kiener, Volker, 4,013,740.

Wuopio, Richard A.: *See*—
Katsumoto, Kiyoshi; and Wuopio, Richard A., 4,013,626.

Wuppermann, Dirk: *See*—
Westermann, Albert; Zimmermann, Frank; Wuppermann, Dirk; Friedrich, Ludwig; and Raschack, Manfred, 4,013,663.

Xerox Corporation: *See*—
Allis, Robert F., 4,013,361.
Beckman, Maynard K., Jr., 4,013,362.
Brown, Richard E., 4,013,641.
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,013,528.
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,013,529.
Chu, Joseph Y. C.; and Gunther, W. H. H., 4,013,530.
Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., 4,013,462.
Mailloux, Louis D., 4,013,355.
Marsh, Dana G.; and Pochan, John M., 4,013,572.
Stark, Howard M.; and Streifer, William, 4,014,030.
Thettu, Raghulinga R.; and Oszczakiewicz, Michael J., 4,013,400.
Turner, Sam R.; and Stolka, Milan, 4,013,623.

Yaguchi, Mitsuro: *See*—
Akachi, Hisateru; Miyajima, Hideo; and Yaguchi, Mitsuro, 4,012,894.

Yamada, Yu, to Canon Kabushiki Kaisha. Optical system for reproduction. 4,013,348, Cl. 350-196.000.

Yamaguchi, Hidenori: *See*—
Harada, Tatsuo; Moriyama, Shigeo; Kita, Toshiaki; and Yamaguchi, Hidenori, 4,012,843.

Yamaguchi, Shin-ichi: *See*—
Kishino, Shigeo; Kudamatsu, Akio; Takase, Iwao; Shiokawa, Kozo; and Yamaguchi, Shin-ichi, 4,013,793.

Yamaichi, Ryozo: *See*—
Suzuki, Kinya; Mori, Kenji; Takeuchi, Yasuo; Torii, Masao; Takahashi, Hiroji; and Yamaichi, Ryozo, 4,012,918.

Yamaki, Yasuhito; and Aiage, Kunio, to Fuji Jukogyo Kabushiki Kaisha. Automatic control system for a gasoline-powered combustion engine. 4,013,056, Cl. 123-179.0BG.

Yamamoto, Hiroshi: *See*—
Nakano, Kiyokazu; Yamamoto, Hiroshi; and Ito, Yasunori, 4,013,364.

Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Murakami, Masuo; Kawada, Hiroitsu; Ohmura, Tadayoshi; and Sugiura, Hiroshi, 4,013,773.

Yamazaki, Hiroharu: *See*—
Hasegawa, Shigeru; Takai, Katsuyoshi; Yamazaki, Hiroharu; Kikkawa, Sueo; and Suyama, Eizo, 4,014,031.

Yamazaki, Toshio: *See*—
Toyota, Hiroshi; Yamazaki, Toshio; and Iketani, Takashi, 4,013,017.

Yamazaki, Yoshio: *See*—
Kamatani, Yoshio; Okazaki, Hisayoshi; Imai, Ko; Fujita, Noriaki; Yamazaki, Yoshio; and Ogino, Katsuhiko, 4,013,509.

Yamoto, Hisayoshi: *See*—
Matsushita, Takeshi; Hayashi, Hisao; Aoki, Teruaki; Yamoto, Hisayoshi; and Kawada, Yoshiyuki, 4,014,037.

Yasuhara, Hikaru: *See*—
Tanaka, Shigenobu; Yasuhara, Hikaru; and Oguchi, Munesuke, 4,013,948.

Yasuhiro, Sato; Toshio, Sato; Shuichi, Kawasaki; Toshio, Takaishi; Sadao, Okuyama; and Norio, Yamanashi, to Toyo Seikan Kaisha Limited. Fruit treating apparatus. 4,013,001, Cl. 99-550.000.

Yasunaga, Tatsuhiro, to Sharp Kabushiki Kaisha. Automatic program locator for tape decks. 4,014,039, Cl. 360-72.000.

Yeda Research & Development Co. Ltd.: *See*—
Goldstein, Leon; Katzir (Katchalski), Ephraim; Levin, Yehuda; and Blumberg, Shmaryahu, 4,013,511.

Yen, Chung H., to G. D. Searle & Co. 2,2-Diaryl-3-(1-azabicyclo[2.2.-2]oct-2-yl)propionamides and intermediates thereto. 4,013,667, Cl. 260-293.530.

Yen, Chung H.: *See*—
Adelstein, Gilbert W.; Karim, Aziz; and Yen, Chung H., 4,013,668.

Yoder, Paul D., to Parker-Hannifin Corporation. Hose clamp body. 4,012,814, Cl. 24-284.000.

Yonemitsu, Eiichi; Igarashi, Takeo; Osaki, Naoto; Aoyama, Tetsuo; and Nakazato, Yukiya, to Mitsubishi Gas Chemical Company, Inc. Process for preparing hydroperoxide. 4,013,725, Cl. 260-610.00B.

Yoshida Kogyo Kabushiki Kaisha: *See*—
Nagase, Mitsuo, 4,013,371.

Yoshida, Osamu: *See*—
Hosokoshi, Kakuichiro; and Yoshida, Osamu, 4,013,467.

Yoshii, Tetsuji, to Matsushita Electric Industrial Co., Ltd. Cassette type magnetic recording and reproducing apparatus. 4,014,043, Cl. 360-137.000.

Yoshizawa, Keiichi, to Kabushiki Kaisha Seikosha. Rotary indicating plate type digital display device. 4,012,898, Cl. 58-2.000.

Young, Burbank: *See*—
Nelson, Arthur L.; Skrabacz, Donald J.; and Young, Burbank, 4,013,775.

Young, Patricia: *See*—
Connor, David T.; Young, Patricia; and Von Strandtmann, Max, 4,013,673.

Yozo, Jizodo: *See*—
Tamura, Tooru; Ojima, Nobuyuki; Kondo, Sigeru; and Yozo, Jizodo, 4,013,612.

Yu, Hwa N.: *See*—
Ho, Irving T.; and Yu, Hwa N., 4,014,036.

Yu, Yuan: *See*—
Biess, John; and Yu, Yuan, 4,013,939.

Zacharowski, Dieter: *See*—
Strauss, Richard; Giller, Arnold; Zacharowski, Dieter; and Wiener, Hans, 4,013,599.

Zahnradfabrik Friedrichshafen AG: *See*—
Jablonsky, Erich, 4,012,993.

Zakrzewski, Robert: *See*—
Meyer, Martin H.; and Zakrzewski, Robert, 4,013,249.

Zangrandi, Vittorio; and Peri, Paolo, to Liquichimica S.p.A. Process for the production of l-aspartic acid by fermentation of hydrocarbons. 4,013,508, Cl. 195-28.00R.

Zardi, Umberto: *See*—
Guadalupi, Mario; Pagani, Giorgia; Zardi, Umberto; and Paris, Ivo, 4,013,718.

Zavatti, Michele; Baravalle, Vittorio; and Saracino, Paolo, to Labofina S.A. Coating compositions for protecting metals. 4,013,603, Cl. 260-28.50D.

Zeigler, John F., III: *See*—
Hwang, Ying-Chen; Peil, William; and Zeigler, John F., III, 4,014,038.

Zeleny, Richard Alan: *See*—
Liang, Shen Fu; and Zeleny, Richard Alan, 4,013,685.

Zeyher, Craig H. Adjustable wrench mechanism. 4,012,971, Cl. 81-170.000.

Zimmer, Darrel E.; and Brace, Paul H., to Barber-Colman Company. Control of heating and cooling available from central sources to a multi-zone temperature controlled space. 4,013,118, Cl. 165-22.000.

Zimmerman, Samuel Morton. Video system and method for presentation and reproduction of x-ray film images. 4,013,833, Cl. 358-111.000.

Zimmermann, Frank: *See*—
Westermann, Albert; Zimmermann, Frank; Wuppermann, Dirk; Friedrich, Ludwig; and Raschack, Manfred, 4,013,663.

Zinnes, Harold; and Lindo, Neil A., to Warner-Lambert Company. 4-(1-Pyrrolidinyl)-2H-1-benzothiopyran-1,1-dioxide. 4,013,686, Cl. 260-326.840.

Zoller, Raimund, to KERAG Kessel-,Apparate- und Anlagenbau Richterswil/Switzerland. Back-pressure-resistant vapor trap for condensate discharge. 4,013,220, Cl. 236-56.000.

Zondlo, John W.: *See*—
Sircar, Shivaji; and Zondlo, John W., 4,013,429.

Zozime, Alain: *See*—
Cohen-Solal, Gerard; Zozime, Alain; and Sella, Claude, 4,013,533.

Zuerger, Manfred: *See*—
Volkert, Otto; Wigger, August; Zuerger, Manfred; and Richter, Peter, 4,013,806.

Zweig, Arnold: *See*—
Henderson, William Arthur, Jr.; and Zweig, Arnold, 4,013,620.

Zydzik, George John: *See*—
Van Uitert, Le Grand Gerard; and Zydzik, George John, 4,013,501.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,278	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976	B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976	B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976	B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976	B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976	B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977	B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976	B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976	B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976	B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976	B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976	B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976	B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976	B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976	B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976	B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976	B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976	B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977	B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976	B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976	B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976	B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976	B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977	B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976	B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977	B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977	B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976	B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976	B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976	B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976	B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976	B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977	B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976	B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976	B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976	B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976	B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976	B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976	B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976	B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976	B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976	B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976	B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977	B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976	B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976	B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976	B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976	B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977	B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976	B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977	B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977	B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977	B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976	B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977	B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976	B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976	B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976	B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976	B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976	B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976	B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976	B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976	B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976	B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976	B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977	B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976	B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976	B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976	B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976	B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976	B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976	B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977	B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977	B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976	B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976	B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976	B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976	B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976	B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976	B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976	B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977	B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976	B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976	B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976	B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976	B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976	B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977	B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF MARCH, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bell & Howell Company: *See—*
Krtous, George F.; and Schreyer, Carl G., Re. 29,159.

Black Clawson Fibreclaim, Inc.: *See—*
Marsh, Paul G., Re. 29,156.

Cartier, Roger J.; Obermann, George; and Willigman, John, to Singer Company, The. Timer blade arrangement. Re. 29,158, Cl. 200-38.00B.

Galkiewicz, Thomas M.: *See—*
Petersen, Kenneth C.; and Galkiewicz, Thomas M., Re. 29,157.

Grinnell Fire Protection Systems Company, Inc.: *See—*
Mears, James W.; and O'Brien, William J., Re. 29,155.

Krtous, George F.; and Schreyer, Carl G., to Bell & Howell Company. Vertical record card adapter for record tape machine. Re. 29,159, Cl. 360-88.000.

Marsh, Paul G., to Black Clawson Fibreclaim, Inc. Fuel by-products of municipal refuse. Re. 29,156, Cl. 44-1.00D.

Mears, James W.; and O'Brien, William J., to Grinnell Fire Protection Systems Company, Inc. On-off sprinkler. Re. 29,155, Cl. 169-37.000.

Obermann, George: *See—*
Cartier, Roger J.; Obermann, George; and Willigman, John, Re. 29,158.

O'Brien, William J.: *See—*
Mears, James W.; and O'Brien, William J., Re. 29,155.

Petersen, Kenneth C.; and Galkiewicz, Thomas M., to Schenectady Chemicals, Inc. High temperature resistant polychloroprene adhesive resin. Re. 29,157, Cl. 260-25.000.

Schenectady Chemicals, Inc.: *See—*
Petersen, Kenneth C.; and Galkiewicz, Thomas M., Re. 29,157.

Schreyer, Carl G.: *See—*
Krtous, George F.; and Schreyer, Carl G., Re. 29,159.

Singer Company, The: *See—*
Cartier, Roger J.; Obermann, George; and Willigman, John, Re. 29,158.

Willigman, John: *See—*
Cartier, Roger J.; Obermann, George; and Willigman, John, Re. 29,158.

LIST OF DESIGN PATENTEES

AB Lundquists Patenter: *See—*
Unghanse, Carl, 243,747.

American Optical Corporation: *See—*
Johnsen, David W., 243,762.

Ameritone Paint Corporation: *See—*
Dorr, Robert C., 243,763.

Barclay, Rodney: *See—*
Koenig, Robert B.; and Barclay, Rodney, 243,730.

Bausch & Lomb Incorporated: *See—*
Huckenbeck, Claus O., 243,761.

Bell, Mace Hudson, to Sybron Corporation. Sphygmomanometer. 243,799, 3-22-77, Cl. D83-12.00R.

Besenbruch-Hofmann Inc.: *See—*
Hinojosa, Charles R., 243,768.

Black and Decker Manufacturing Company, The: *See—*
Bunyea, Roderick Francis, 243,787.
House, Lawrence Emmerson, II; and Bunyea, Roderick Francis, 243,742.

Blanco, Ricardo Godofredo, to Dia S.R.L. Armchair. 243,727, 3-22-77, Cl. D6-69.000.

Breneman, Inc.: *See—*
Erpenbeck, Paul J., 243,743.

Bridgestone Tire Company Limited: *See—*
Hayakawa, Toshio; and Nakamura, Sigemitsu, 243,757.
Makino, Shigeo; Kojima, Hiroshi; Hayakawa, Toshio; and Watanabe, Shigeo, 243,756.

Bunyea, Roderick Francis, to Black and Decker Manufacturing Company, The. Detachable flashlight head. 243,787, 3-22-77, Cl. D48-24.00A.

Bunyea, Roderick Francis: *See—*
House, Lawrence Emmerson, II; and Bunyea, Roderick Francis, 243,742.

Bustos, Rafael T., to Legget & Platt Incorporated; and International Beverage Supply Displays Inc., part interest to each. Display rack. 243,734, 3-22-77, Cl. D6-134.000.

Canadian Lady-Canadelle Inc.: *See—*
Poirier, Louise, 243,722.

Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., to General Mills Fun Group, Inc. Toy medical unit. 243,784, 3-22-77, Cl. D34-15.00R.

Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., to General Mills Fun Group, Inc. Toy medical unit. 243,785, 3-22-77, Cl. D34-15.00R.

Danta, Randall: *See—*
McKinnon, Eugene T.; Drutz, Alvin S.; and Danta, Randall, 243,772.

Dart Industries Inc.: *See—*
Painter, David L., 243,737.

Devinney, Robert C., Jr., to Larson Enterprises, Inc. Photo lamp. 243,760, 3-22-77, Cl. D16-42.000.

Dia S.R.L.: *See—*
Blanco, Ricardo Godofredo, 243,727.

Dillon, Richard R.: *See—*
Graham, John F.; and Dillon, Richard R., 243,771.

Dolnar, Hubert, to Unican Security Systems, Ltd. Pull. 243,744, 3-22-77, Cl. D8-318.000.

Dominion Auto Accessories Limited: *See—*
Nagel, Robert I., 243,791.
Nagel, Robert I., 243,792.
Nagel, Robert I., 243,793.

Donaldson, Linda Jansen, to General Mills Fun Group, Inc. Soap dispenser or the like. 243,731, 3-22-77, Cl. D6-95.000.

Dorr, Robert C., to Ameritone Paint Corporation. Color selection guide. 243,763, 3-22-77, Cl. D19-59.000.

Drutz, Alvin S.: *See—*
McKinnon, Eugene T.; Drutz, Alvin S.; and Danta, Randall, 243,772.

E-Z-EM Company Inc.: *See—*
Greene, Franklin R., 243,797.

England, Donald E.: *See—*
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,784.
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,785.

Enners, Richard Walton. Shelving and light fixtures therefor. 243,735, 3-22-77, Cl. D6-186.000.

Erpenbeck, Paul J., to Breneman, Inc. Manual window shade and roller cut off knife. 243,743, 3-22-77, Cl. D8-98.000.

Foggia, Donald A., to Siemens Corporation. Switchboard for telecommunications switching system. 243,773, 3-22-77, Cl. D14-58.000.

Fratelli Saporiti: *See—*
Offredi, Giovanni, 243,726.
Offredi, Giovanni, 243,728.
Offredi, Giovanni, 243,729.

GAF Corporation: *See—*
Miller, Paul D., 243,758.

General Electric Company: *See—*
Hauenstein, Max C., 243,741.

General Mills Fun Group, Inc.: *See—*
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,784.
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,785.
Donaldson, Linda Jansen, 243,731.

Gianacakos, Constantine P. Restaurant building. 243,770, 3-22-77, Cl. D25-9.000.

Giordano, George P.: *See—*
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,784.
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,785.

Graham, John F.; and Dillon, Richard R., to Honeywell Information Systems, Inc. Computer or similar article. 243,771, 3-22-77, Cl. D14-44.000.

Greene, Franklin R., to E-Z-EM Company Inc. Flexible container for barium radiological examinations. 243,797, 3-22-77, Cl. D83-1.00U.

Gregory, Arthur J. Mortar and pestle cover. 243,776, 3-22-77, Cl. D24-23.000.

Hauenstein, Max C., to General Electric Company. Coffeemaker lid or similar article. 243,741, 3-22-77, Cl. D7-131.000.

Hayakawa, Toshio; and Nakamura, Sigemitsu, to Bridgestone Tire Company Limited. Vehicle tire. 243,757, 3-22-77, Cl. D12-147.000.

Hayakawa, Toshio: *See—*
Makino, Shigeo; Kojima, Hiroshi; Hayakawa, Toshio; and Watanabe, Shigeo, 243,756.

Hegemann, Manfred: *See—*
Wasko, Bernard; and Hegemann, Manfred, 243,750.

Hickey, Thomas F. G. Hoop target for lawn game. 243,782, 3-22-77, Cl. D34-5.0PP.

Hinojosa, Charles R., to Besenbruch-Hofmann Inc. Brake fluid filter. 243,768, 3-22-77, Cl. D23-4.000.

Hoeweler, Alan E.: *See—*
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,784.
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,785.

Honeywell Information Systems, Inc.: *See—*
Graham, John F.; and Dillon, Richard R., 243,771.

House, Lawrence Emmerson, II; and Bunyea, Roderick Francis, to Black and Decker Manufacturing Company, The. Cordless tool. 243,742, 3-22-77, Cl. D8-69.000.

Huckenbeck, Claus O., to Bausch & Lomb Incorporated. Binocular with eyecups therefor. 243,761, 3-22-77, Cl. 16-59.000.

Huffman, Erline L. Visor cap. 243,725, 3-22-77, Cl. D2-244.000.

International Beverage Supply Displays Inc.: *See—*
Bustos, Rafael T., 243,734.

Isaacs, Harold. Sump basin. 243,766, 3-22-77, Cl. D23-1.000.

Ishizuka, Haruo. Pillow. 243,736, 3-22-77, Cl. D6-203.000.

Johnsen, David W., to American Optical Corporation. Pair of spectacles. 243,762, 3-22-77, Cl. D16-65.000.

Johnson, Michael K. Wine rack. 243,738, 3-22-77, Cl. D7-71.000.

Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 243,795.

Kardas, James R. Cart for house and garden tools. 243,752, 3-22-77, Cl. D12-32.000.

Kleinman, Leonard; and Zelenko, Harry. Puzzle or similar article. 243,783, 3-22-77, Cl. D34-15.00M.

Koenig, Robert B.; and Barclay, Rodney, to Recognition Equipment Incorporated. Wand holder. 243,730, 3-22-77, Cl. D6-85.000.

Kojima, Hiroshi: *See—*
Makino, Shigeo; Kojima, Hiroshi; Hayakawa, Toshio; and Watanabe, Shigeo, 243,756.

Krause, Daniel F., to Teletymer Inc. Interval signalling timer. 243,748, 3-22-77, Cl. D10-40.000.

Lane Drug Company, The: *See—*
Swartz, Ronald E., 243,798.

Larson Enterprises, Inc.: *See—*
Devinney, Robert C., Jr., 243,760.

Lear Siegler, Inc.: *See—*
Pareja, Ramon, 243,796.

Legget & Platt Incorporated: *See—*
Bustos, Rafael T., 243,734.

Lewis, Frederick T. Putting target unit for a golf game apparatus. 243,777, 3-22-77, Cl. D34-5.0NN.

Lloyd, John Neville. Briefs. 243,721, 3-22-77, Cl. D2-10.000.

Lynn, William J.: *See—*
Price, John; Seeger, Richard E.; and Lynn, William J., 243,751.

Makino, Shigeo; Kojima, Hiroshi; Hayakawa, Toshio; and Watanabe, Shigeo, to Bridgestone Tire Company Limited. Vehicle tire. 243,756, 3-22-77, Cl. D12-142.000.

Mast, Richard, to Ricar Industries Inc. Heated cap for conditioning hair and permanent waving. 243,800, 3-22-77, Cl. D28-19.000.

Mayer, John F.: *See—*
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,784.
Cordrey, Robert E.; England, Donald E.; Giordano, George P.; Hoeweler, Alan E.; and Mayer, John F., 243,785.

Mazza, James P. Meat lifting tongs. 243,739, 3-22-77, Cl. D7-105.000.

McKinnon, Eugene T.; Drutz, Alvin S.; and Danta, Randall, to McKinnon, Eugene T.; and Drutz, Alvin S. Motor controlling relay. 243,772, 3-22-77, Cl. D13-33.000.

Menninger, Edward F., to Valeron Corporation, The. Electronic part sizing gage. 243,749, 3-22-77, Cl. D10-71.000.

Miller, Paul D., to GAF Corporation. Microfiche reader-printer. 243,758, 3-22-77, Cl. D16-28.000.

Mobius, Werner. Combined pencil sharpener and catch box. 243,764, 3-22-77, Cl. D19-73.000.

Molinaro, Perry J. Combined pipe and tobacco container. 243,774, 3-22-77, Cl. D27-6.000.

Mukai, Hitoshi, to Sansui Electric Co., Ltd. Combined amplifier and tuner. 243,794, 3-22-77, Cl. D14-71.000.

Nagel, Robert I., to Dominion Auto Accessories Limited. Marker lens. 243,791, 3-22-77, Cl. D48-32.00A.

Nagel, Robert I., to Dominion Auto Accessories Limited. Marker lens. 243,792, 3-22-77, Cl. D48-32.00A.

Nagel, Robert I., to Dominion Auto Accessories Limited. Marker lens. 243,793, 3-22-77, Cl. D48-32.00A.

Nakai, Tadanobu, to Tokiwa Chemical Industries, Limited. Collapsible cockroach catcher or similar article. 243,765, 3-22-77, Cl. D22-19.000.

Nakamura, Sigemitsu: *See—*
Hayakawa, Toshio; and Nakamura, Sigemitsu, 243,757.

Offredi, Giovanni, to Fratelli Saporiti. Chair. 243,726, 3-22-77, Cl. D6-69.000.

Offredi, Giovanni, to Fratelli Saporiti. Upholstered seat. 243,728, 3-22-77, Cl. D6-71.000.

Offredi, Giovanni, to Fratelli Saporiti. Chair. 243,729, 3-22-77, Cl. D6-75.000.

Ohsawa, Yoichi, to Win Lighter Corporation. Lighter. 243,775, 3-22-77, Cl. D27-36.000.

Painter, David L., to Dart Industries Inc. Coffeemaker. 243,737, 3-22-77, Cl. D7-62.000.

Pareja, Ramon, to Lear Siegler, Inc. Pump. 243,796, 3-22-77, Cl. D15-7.000.

Poirier, Louise, to Canadian Lady-Canadelle Inc. Brassiere. 243,722, 3-22-77, Cl. D2-24.000.

Price, John; Seeger, Richard E.; and Lynn, William J. Keyboard for a calculator or a combined calculator ad watch or similar article. 243,751, 3-22-77, Cl. D10-122.000.

Raupp, Kenneth A.; and Raupp, Ruth M. Trailer. 243,753, 3-22-77, Cl. D12-102.000.

Raupp, Ruth M.: *See—*
Raupp, Kenneth A.; and Raupp, Ruth M., 243,753.

Raymont, William R. Golf club head. 243,778, 3-22-77, Cl. D34-5.0GH.

Recognition Equipment Incorporated: *See—*
Koenig, Robert B.; and Barclay, Rodney, 243,730.

Ricar Industries Inc.: *See—*
Mast, Richard, 243,800.

Rocchio, Chris A. Drip catcher for a paint spray gun. 243,769, 3-22-77, Cl. D23-36.000.

Rocky Mountain Featherbed Company, Inc.: *See—*
Schaefer, Francis A., 243,723.
Schaefer, Francis A., 243,724.

Rutherford, Harry Wayne. Water softener. 243,767, 3-22-77, Cl. D23-3.000.

Sansui Electric Co., Ltd.: *See—*
Mukai, Hitoshi, 243,794.

Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Cartridge type ink roll. 243,795, 3-22-77, Cl. D64-11.00R.

Schaefer, Francis A., to Rocky Mountain Featherbed Company, Inc. Vest. 243,723, 3-22-77, Cl. D2-190.000.

Schaefer, Francis A., to Rocky Mountain Featherbed Company, Inc. Jacket. 243,724, 3-22-77, Cl. D2-191.000.

Schroeder, Peter E. Curtain material. 243,788, 3-22-77, Cl. D47-6.00E.

Schroeder, Peter E. Curtain material. 243,789, 3-22-77, Cl. D47-6.00E.

Schroeder, Peter E. Curtain material No. 588. 243,790, 3-22-77, Cl. D47-6.00E.

Seeger, Richard E.: *See—*
Price, John; Seeger, Richard E.; and Lynn, William J., 243,751.

Shaw, Jerry; and Solitt, Samuel G. Jewelry display case. 243,733, 3-22-77, Cl. D6-127.000.

Siemens Corporation: *See—*
Foggia, Donald A., 243,773.

Silva, John Cruze, Jr. Bicycle. 243,754, 3-22-77, Cl. D12-111.000.

Silva, John Cruze, Jr. Bicycle. 243,755, 3-22-77, Cl. D12-111.000.

Snall, William R. Hibachi. 243,740, 3-22-77, Cl. D7-110.000.

Solitt, Samuel G.: *See—*
Shaw, Jerry; and Solitt, Samuel G., 243,733.

Swartz, Ronald E., to Lane Drug Company, The. Medicine tray. 243,798, 3-22-77, Cl. D83-1.000.

Sybron Corporation: *See—*
Bell, Mace Hudson, 243,799.

Teletymer Inc.: *See—*
Krause, Daniel F., 243,748.

Tokiwa Chemical Industries, Limited: *See—*
Nakai, Tadanobu, 243,765.

Unghanse, Carl, to AB Lundquists Patenter. Wire clamp. 243,747, 3-22-77, Cl. D8-396.000.

Unican Security Systems, Ltd.: *See—*
Dolnar, Hubert, 243,744.

Utzinger, Jerry L. Tractor towing hitch. 243,759, 3-22-77, Cl. D15-28.000.

Valeron Corporation, The: *See—*
Menninger, Edward F., 243,749.

Vogt, Joseph J. Combined display and storage rack. 243,732, 3-22-77, Cl. D6-127.000.

Voland Corporation: *See—*
Wasko, Bernard; and Hegemann, Manfred, 243,750.

Wasko, Bernard; and Hegemann, Manfred, to Voland Corporation. Digital display balance. 243,750, 3-22-77, Cl. D10-91.000.

Watanabe, Shigeo: *See—*
Makino, Shigeo; Kojima, Hiroshi; Hayakawa, Toshio; and Watanabe, Shigeo, 243,756.

White, John V. Toy baby carriage. 243,786, 3-22-77, Cl. D34-15.0AJ.

Win Lighter Corporation: *See—*
Ohsawa, Yoichi, 243,775.

Yamagata, Arisuke. Pocket amusement device. 243,779, 3-22-77, Cl. D34-15.00R.

Yamagata, Arisuke. Pocket pin ball game box. 243,780, 3-22-77, Cl. D34-5.0JJ.

Yamagata, Arisuke. Pocket baseball game box. 243,781, 3-22-77, Cl. D34-5.0BG.

Youngblood, John W. Ski rope reel. 243,745, 3-22-77, Cl. D8-359.000.

Youngblood, John W. Portable reel. 243,746, 3-22-77, Cl. D8-359.000.

Zelenko, Harry: *See—*
Kleinman, Leonard; and Zelenko, Harry, 243,783.

CLASSIFICATION OF PATENTS

ISSUED MARCH 22, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2
411 4,012,794

CLASS 3
1.91 4,012,795
4,012,796

CLASS 4
10 4,012,797
166 4,012,798

CLASS 5
81 R 4,012,799
187 4,012,800
247 4,012,801
4,012,802

CLASS 8
2.5 A 4,013,405
11 4,013,404
17 4,013,406
4,013,407
26 4,013,408
127.51 4,013,409

CLASS 10
132 4,012,803

CLASS 14
71.3 4,012,804

CLASS 15
50 R 4,012,805

CLASS 16
121 4,012,806
128.1 4,012,807

CLASS 17
1 R 4,012,808

CLASS 19
144.5 4,012,809
294 4,012,810

CLASS 21
58 4,013,410

CLASS 23
230 B 4,013,411
230 PC 4,013,412
230 R 4,013,413
4,013,414
252 R 4,013,415
253 R 4,013,417
4,013,418
253 TP 4,013,416
259 4,013,419
259.5 4,013,420
273 SP 4,013,421
282 4,013,422
288 S 4,013,423

CLASS 24
84 H 4,012,811
90 B 4,012,812
150 R 4,012,813
284 4,012,814

CLASS 26
28 4,012,815

CLASS 28
1.3 4,012,816

CLASS 29
25.42 4,012,817
26 A 4,012,818
79 4,012,819
103 R 4,012,820
116 R 4,012,821
194 4,013,424
195.5 4,013,425
418 4,012,823
419 R 4,012,824
427 4,012,825
446 4,012,826
453 4,012,827
517 4,012,828
567 4,012,829
568 4,012,830
570 4,012,831
575 4,012,832
591 4,012,833
4,012,835
597 4,012,834
700 4,012,822

CLASS 30
2 4,012,836
43.9 4,012,837

CLASS 32
2 4,012,838
15 4,012,839
4,012,840
27 4,012,841
58 4,012,842

CLASS 33
19 A 4,012,843
252 4,012,844

CLASS 34
9 4,012,845
57 R 4,012,846
75 4,012,847

CLASS 35
8 A 4,012,848
9 R 4,012,849
10 4,012,850
44 4,012,851
48 R 4,012,852

CLASS 36
17 R 4,012,853
29 4,012,854
4,012,855

CLASS 37
187 4,012,856

CLASS 40
2 B 4,012,857
152 4,012,858

CLASS 42
75 C 4,012,859
94 4,012,860

CLASS 43
15 4,012,861
42.06 4,012,862
43.12 4,012,863

CLASS 44
1 D Re.29,156
1 R 4,013,426

CLASS 46
47 4,012,864
79 4,012,865

CLASS 47
6 4,012,866
17 4,012,867

CLASS 48
62 R 4,013,427
202 4,013,428

CLASS 49
380 4,012,868

CLASS 51
163.2 4,012,869
165 R 4,012,870

CLASS 52
79.4 4,012,871
81 4,012,872
99 4,012,873
4,012,874
168 4,012,875
233 4,012,876
275 4,012,877
288 4,012,878
508 4,012,879
585 4,012,880
604 4,012,881
615 4,012,882
729 4,012,883

CLASS 53
38 4,012,886
48 4,012,887
131 4,012,888
183 4,012,889
198 R 4,012,890

CLASS 55
33 4,013,429
37 4,013,430
70 4,013,431
467 4,013,432

CLASS 56
305 4,012,891
341 4,012,892

CLASS 57
34 AT 4,012,894
34 R 4,012,893
77.4 4,012,895
4,012,896
4,012,897

CLASS 58
2 4,012,898
23 D 4,012,899
126 D 4,012,900
130 R 4,012,901

CLASS 60
39.02 4,012,902
39.45 4,012,903
39.65 4,012,904
277 4,012,906
286 4,012,905
315 4,012,907
354 4,012,908
371 4,012,909
520 4,012,910
531 4,012,911
682 4,012,912

CLASS 61
45 B 4,012,913
45 D 4,012,914
53 4,012,915
85 4,012,916
91 4,012,917
107 4,012,918
108 4,012,919

CLASS 62
2 4,012,920
151 4,012,921
240 4,012,922
382 4,013,434

CLASS 64
11 R 4,012,923
21 4,012,924
4,012,925

CLASS 65
2 4,013,433
11 W 4,013,435
32 4,013,436
76 4,013,437
94 4,013,438
330 4,013,439

CLASS 66
63 4,012,926
78 4,012,927

CLASS 70
81 4,012,928
134 4,012,929
234 4,012,930
363 4,012,931

CLASS 71
24 4,013,440
28 4,013,442
31 4,013,443
76 4,013,444
4,013,445
86 4,013,446
91 4,013,447
92 4,013,441
4,013,448
106 4,013,449
111 4,013,450
116 4,013,451
120 4,013,452

CLASS 72
187 4,012,932
217 4,012,933
324 4,012,934
325 4,012,935
369 4,012,936
419 4,012,937
422 4,012,938

CLASS 73
3 4,012,939
4 R 4,012,940
6 4,012,941
35 4,012,942
37.7 4,012,943
40.5 R 4,012,944
49.2 4,012,945
67.5 R 4,012,950
67.6 4,012,951
67.7 4,012,946
4,012,952
181 4,012,947
113 4,012,948
114 4,012,949
141 A 4,012,953
150 R 4,012,954
190 EW 4,012,955
201 4,012,956
231 R 4,012,957
4,012,958
398 R 4,012,959
410 4,012,960

CLASS 74
230.7 4,012,961
233 4,012,962
242.15 R 4,012,963
435 4,012,964
513 4,012,965
553 4,012,966
586 4,012,967
711 4,012,968

CLASS 75
.5 R 4,013,453
41 4,013,454
68 R 4,013,455
77 4,013,456
104 4,013,457
124 4,013,458
171 4,013,459
204 4,013,460
212 4,013,461

CLASS 76
36 4,012,969
102 4,012,970

CLASS 81
170 4,012,971

CLASS 82
70.2 4,012,972
82 4,012,973

CLASS 83
6 4,012,974
140 4,012,975
146 4,012,976
368 4,012,977
669 4,012,978

CLASS 84
1.01 4,012,979
4,012,980
4,012,981
4,012,982
400 4,012,983

CLASS 85
70 4,012,984

CLASS 89
1.701 4,012,987
1.806 4,012,988
1.818 4,012,985
17 4,012,986
41 EA 4,012,989

CLASS 90
1.4 4,012,990
13.05 4,012,991
15 R 4,012,992

CLASS 91
371 4,012,993
499 4,012,994

CLASS 92
152 4,012,995

CLASS 93
36.3 4,012,996
36.8 4,012,997
39 R 4,012,998
51.1 4,012,999

CLASS 96
1 PS 4,013,462
1.5 4,013,463
4,013,464
36 4,013,465
4,013,466
36.1 4,013,467
50 PT 4,013,468
63 4,013,469
66.3 4,013,471
67 4,013,472
95 4,013,470
114.1 4,013,473

CLASS 99
550 4,013,001

CLASS 100
35 4,013,002
285 4,013,003

CLASS 101
1 4,013,004
110 4,013,005
227 4,013,006
333 4,013,007
451 4,013,008

CLASS 102
35.6 4,013,009
39 4,013,010
65.2 4,013,011
70.2 R 4,013,012
72 4,013,013

CLASS 104
148 LM 4,013,014
172 BT 4,013,015

CLASS 105
199 R 4,013,016
366 C 4,013,017
468 4,013,018

CLASS 106
2 4,013,474
10 4,013,475
15 FP 4,013,476
73.4 4,013,477
98 4,013,478
133 4,013,479
213 4,013,480
309 4,013,481

CLASS 108
5 4,013,019
51.1 4,013,020
4,013,021
114 4,013,022

CLASS 110
8 A 4,013,023
98 R 4,013,024

CLASS 112
121.15 4,013,025
153 4,013,026
155 4,013,027
220 4,013,028

CLASS 114
74 A 4,013,030
204 4,013,031
248 R 4,013,032
255 4,013,029

CLASS 115
42 4,013,033

CLASS 116
31 4,013,034
124 B 4,013,035
129 T 4,013,036

CLASS 118
2 4,013,037
5 4,013,038
7 4,013,039
415 4,013,040
656 4,013,041

CLASS 119
3 4,013,042
14.09 4,013,043
16 4,013,044

CLASS 122
240 R 4,013,045

CLASS 123
8.27 4,013,046
41.2 4,013,047
52 M 4,013,049
56 BC 4,013,048
117 R 4,013,050
119 A 4,013,052
119 B 4,013,051
136 4,013,053
4,013,054
139 AR 4,013,055
179 BG 4,013,056
193 P 4,013,057
195 AC 4,013,058

CLASS 126
120 4,013,059
163 R 4,013,060
263 4,013,061
271 4,013,062

CLASS 127
9 4,013,482

CLASS 128
1 R 4,013,063
2 F 4,013,064
2 R 4,013,065
4,013,066
2.05 R 4,013,067
2.1 B 4,013,068
24 R 4,013,069
80 C 4,013,070
92 B 4,013,071
214 C 4,013,072
216 4,013,073
260 4,013,074
266 4,013,075
276 4,013,076
295 4,013,077
303 R 4,013,078
341 4,013,079
347 4,013,080
419 P 4,013,081

CLASS 131
140 P 4,013,082

CLASS 132
9 4,013,083
11 R 4,013,084
89 4,013,085
110 4,013,086

CLASS 137
4,013,087
116 4,013,088
218 4,013,089
329.05 4,013,090
414 4,013,091
426 4,013,092
491 4,013,093
597 4,013,094
599 4,013,095
612.1 4,013,096

CLASS 138
93 4,013,097
106 4,013,098
109 4,013,099
129 4,013,100
130 4,013,101
144 4,013,102

CLASS 139
11 4,013,103

CLASS 141
18 4,013,104
86 4,013,105

CLASS 144

34 R 4,013,106
35 R 4,013,107
175 4,013,108

CLASS 148

1.5 4,013,483
4,013,484
4,013,485
9.5 4,013,486
16.5 4,013,487
143 4,013,488
174 4,013,489

CLASS 149

2 4,013,490
19.3 4,013,491

CLASS 150

52 R 4,013,109

CLASS 151

14 R 4,013,110

CLASS 152

182 4,013,112
347 4,013,111

CLASS 156

85 4,013,496
86 4,013,494
98 4,013,495
154 4,013,497
345 4,013,498
394 4,013,499
425 4,013,500
605 4,013,501
608 4,013,502
609 4,013,503
632 4,013,492
654 4,013,493

CLASS 159

4 4,013,504

CLASS 160

36 4,013,113
330 4,013,114

CLASS 162

5 4,013,505
49 4,013,506

CLASS 164

51 4,013,115
262 4,013,116

CLASS 165

10 4,013,117
22 4,013,118
27 4,013,119
48 4,013,120
154 4,013,122
162 4,013,121

CLASS 166

250 4,013,123
4,013,124
273 4,013,125

CLASS 168

4 4,013,126

CLASS 169

37 Re.29,155
57 4,013,127
61 4,013,128

CLASS 172

370 4,013,131
464 4,013,129
719 4,013,130
804 4,013,132

CLASS 173

32 4,013,133

CLASS 174

43 4,013,826

CLASS 175

73 4,013,134

CLASS 177

144 4,013,135

CLASS 178

18 4,013,835
58 R 4,013,836

CLASS 179

1.5 S 4,013,837
2 A 4,013,838
7 R 4,013,839
15 BT 4,013,841
15 FD 4,013,840
4,013,842
18 EB 4,013,843
99 4,013,844
100.41 R 4,013,845
115.5 R 4,013,846

CLASS 180

68.5 4,013,136
69 R 4,013,137
108 4,013,139
133 4,013,138

CLASS 182

1 4,013,140

CLASS 184

6.11 4,013,141

CLASS 187

20 4,013,142

CLASS 188

1 A 4,013,143
24 4,013,144
32 4,013,145
71.6 4,013,146
218 XL 4,013,147
264 D 4,013,148
281 4,013,149
326 4,013,150

CLASS 192

6 R 4,013,151
24 4,013,152
53 F 4,013,153
58 B 4,013,154
096 4,013,155
105 BA 4,013,156

CLASS 194

1 N 4,013,157

CLASS 195

1.8 4,013,507
28 R 4,013,508
30 4,013,509
31 R 4,013,510
63 4,013,511
66 R 4,013,512
4,013,513
68 4,013,514
80 R 4,013,515

CLASS 197

1 R 4,013,158
4,013,159
151 4,013,160

CLASS 198

409 4,013,162
575 4,013,163
655 4,013,164
781 4,013,161
817 4,013,165
835 4,013,166
861 4,013,167

CLASS 200

18 4,013,847
38 B Re.29,158
51.09 4,013,849
51.1 4,013,848
61.27 4,013,850
86 R 4,013,851
146 R 4,013,852
148 B 4,013,853
153 S 4,013,854
314 4,013,855
4,013,856
315 4,013,857
321 4,013,858

CLASS 201

2.5 4,013,516

CLASS 202

241 4,013,518
262 4,013,517

CLASS 203

33 4,013,519
34 4,013,520
85 4,013,521

CLASS 204

1 T 4,013,522
43 G 4,013,523
59 R 4,013,524
98 4,013,525
129.46 4,013,526
151 4,013,527
158 R 4,013,528
4,013,529
4,013,530
180 R 4,013,531
192 C 4,013,532
192 M 4,013,534
192 S 4,013,533
252 4,013,535
4,013,536
256 4,013,537
280 4,013,538
298 4,013,539

CLASS 206

386 4,013,168
444 4,013,169
521 4,013,170

CLASS 208

4 4,013,540
32 4,013,541
33 4,013,542
50 4,013,543
93 4,013,544
111 4,013,545
216 4,013,547
4,013,637
255 4,013,548
323 4,013,549

CLASS 209

9 4,013,550
73 4,013,551
80.5 4,013,171

CLASS 210

12 4,013,552
28 4,013,553
40 4,013,554
51 4,013,555
136 4,013,556
138 4,013,557
149 4,013,558
151 4,013,559
152 4,013,560
222 4,013,561
232 4,013,562
407 4,013,563
434 4,013,564
500 M 4,013,565
502 4,013,566

CLASS 211

51 4,013,172
126 4,013,173

CLASS 212

68 4,013,174

CLASS 213

20 4,013,175

CLASS 214

1 BD 4,013,176
1 Q 4,013,177
2.5 4,013,178
8.5 K 4,013,179
10 4,013,180
82 4,013,181
145 A 4,013,182
152 4,013,183
505 4,013,184
621 4,013,185
660 4,013,186

CLASS 215

100 A 4,013,187
347 4,013,188

CLASS 219

10.49 4,013,859
10.55 D 4,013,861
10.81 4,013,860
69 D 4,013,863
69 E 4,013,862
80 4,013,864
117 HD 4,013,865
121 P 4,013,866
4,013,867
137 WM 4,013,868
401 4,013,869
451 4,013,870
471 4,013,871
497 4,013,872
541 4,013,873

CLASS 220

9 LG 4,013,189
22 4,013,190
203 4,013,191

CLASS 221

7 4,013,192
264 4,013,193

CLASS 222

23 4,013,194
95 4,013,195
193 4,013,196
402.24 4,013,197
438 4,013,198
4,013,199
534 4,013,200

CLASS 224

25 A 4,013,201
42.24 4,013,203
45 M 4,013,202

CLASS 226

21 4,013,204
173 4,013,205

CLASS 227

83 4,013,206
120 4,013,207

CLASS 228

44.1 A 4,013,208
4,013,209
106 4,013,210
126 4,013,211
203 4,013,212

CLASS 229

39 R 4,013,213
44 R 4,013,214

CLASS 232

43.1 4,013,215

CLASS 234

34 4,013,216

CLASS 235

92 PC 4,013,874
150.2 4,013,875
151 4,013,876
151.21 4,013,877
151.35 4,013,878
164 4,013,879

CLASS 236

13 4,013,217
34.5 4,013,218
46 R 4,013,219
56 4,013,220

CLASS 237

8 R 4,013,221

CLASS 239

98 4,013,222
102 4,013,223
148 4,013,224
195 4,013,225
265.29 4,013,226
291 4,013,227
401 4,013,228
493 4,013,229
499 4,013,230
579 4,013,231

CLASS 240

2 AD 4,013,880
6.42 4,013,881
6.46 4,013,882
7.1 LJ 4,013,883

CLASS 241

3 4,013,232
80 4,013,233
101.6 4,013,234
117 4,013,235

CLASS 242

1 4,013,236
18 PW 4,013,237
47.01 4,013,238
55.19 A 4,013,239
55.53 4,013,240
84.52 B 4,013,241
129.51 4,013,242
130 4,013,243

CLASS 244

3.13 4,013,244
3.16 4,013,245
54 4,013,246
137 P 4,013,247
145 4,013,248

CLASS 248

4 4,013,249
37.3 4,013,250
210 4,013,251
220.4 4,013,252
223.3 4,013,253
243 4,013,254
313 4,013,255
346 4,013,256
379 4,013,257
381 4,013,258

CLASS 249

57 4,013,259

CLASS 250

202 4,013,884
203 R 4,013,885
221 4,013,886
282 4,013,887
304 4,013,888
332 4,013,889
343 4,013,260
453 4,013,261
480 4,013,890
492 A 4,013,262
4,013,891
504 4,013,892
540 4,013,567
568 4,013,893
569 4,013,894

CLASS 251

6 4,013,263
56 4,013,264
205 4,013,265

CLASS 252

8.5 C 4,013,568
8.55 D 4,013,569
30 4,013,570
42 4,013,571
62.1 P 4,013,572
89 R 4,013,573
4,013,574
104 4,013,575
106 4,013,576
109 4,013,577
140 4,013,578
143 4,013,579
182 4,013,580
186 4,013,581
299 4,013,582
415 4,013,546
4,013,583
4,013,584
427 4,013,585
437 4,013,586
448 4,013,587
454 4,013,588
455 R 4,013,589
4,013,590
512 4,013,591
521 4,013,592
522 4,013,593
544 4,013,594
545 4,013,595

CLASS 254

69 4,013,266
85 4,013,267
88 4,013,268
134.3 PA 4,013,269
173 R 4,013,270

CLASS 259

2 4,013,271
4 R 4,013,272
8 4,013,273
102 4,013,274
185 4,013,275
191 4,013,276

CLASS 260

2 R 4,013,596
2.5 B 4,013,597
13 4,013,598
17.3 4,013,599
17.4 ST 4,013,600
18 PN 4,013,601
22 R 4,013,602
25 Re.29,157
28.5 D 4,013,603
29.3 4,013,605
29.4 UA 4,013,606
29.6 H 4,013,607
29.6 RB 4,013,604
32.6 N 4,013,608
33.6 UA 4,013,609
37 EP 4,013,610
4,013,612
37 SB 4,013,611
40 R 4,013,613
4,013,614
42.46 4,013,616
42.53 4,013,615
42.55 4,013,617
45.8 A 4,013,619
45.8 N 4,013,618
45.9 R 4,013,621
45.95 S 4,013,622
63 UY 4,013,623
75 R 4,013,624
77.5 AA 4,013,625
78 P 4,013,626
112.7 4,013,628
123.7 4,013,629
145 A 4,013,630
157 4,013,631
158 4,013,632
162 4,013,633
167 4,013,634
199 4,013,635
207 4,013,636
239 BA 4,013,638
239 D 4,013,639
239.3 A 4,013,640
239.3 P 4,013,641
240 CA 4,013,642
240 D 4,013,644
240 K 4,013,643
243 C 4,013,645
4,013,650
4,013,651
244 A 4,013,646
244 R 4,013,648
4,013,652
4,013,653
247.2 A 4,013,647
248 AS 4,013,649
4,013,654
249.6 4,013,655
250 A 4,013,658
250 P 4,013,657
268 PC 4,013,660
283 CN 4,013,661
287 D 4,013,663
287 K 4,013,662
288 CF 4,013,665
288 D 4,013,664
289 C 4,013,666
293.53 4,013,667
293.54 4,013,668
294.9 4,013,656
295 AM 4,013,670
295 R 4,013,669
295 T 4,013,671
296 P 4,013,672
297 B 4,013,673
302 R 4,013,674
306.8 A 4,013,675
307 H 4,013,676
308 R 4,013,677
309 4,013,678
326 E 4,013,685
326.84 4,013,686
326.9 4,013,679
332.2 A 4,013,680
332.2 C 4,013,681
340.5 4,013,682
340.6 4,013,689
343 4,013,691
343.3 R 4,013,690
346.2 M 4,013,694
346.2 R 4,013,692
346.8 R 4,013,683
347.3 4,013,684
376 4,013,687
390 4,013,693
397.45 4,013,688
410.9 R 4,013,695
413 4,013,697
448 R 4,013,699
448.8 R 4,013,698
449 R 4,013,700
453 AR 4,013,701
463 4,013,702
464 4,013,703
465 C 4,013,705
465 H 4,013,704
471 C 4,013,706
471 R 4,013,707
473 G 4,013,708
483 4,013,709
484 A 4,013,710
488 B 4,013,711
497 R 4,013,712
505 R 4,013,713
535 P 4,013,714
543 P 4,013,715
553 A 4,013,716
553 E 4,013,717
555 A 4,013,718
559 B 4,013,719
570.5 CA 4,013,720
586 D 4,013,721
593 H 4,013,722
601 R 4,013,723
609 D 4,013,724
610 B 4,013,725
611 F 4,013,726
613 R 4,013,727
619 A 4,013,728
632 C 4,013,729
643 A 4,013,731
650 R 4,013,730
668 D 4,013,733
668 R 4,013,732
672 R 4,013,734
673.5 4,013,735
676 R 4,013,736
683.2 4,013,737
4,013,738
880 R 4,013,620
4,013,739
927 N 4,013,740

CLASS 261

44 R 4,013,741
130 4,013,742

CLASS 264

3 R 4,013,743
11 4,013,744
37 4,013,745
66 4,013,746
73 4,013,747
90 4,013,748

128 4,013,749
136 4,013,750
140 4,013,751
154 4,013,752
168 4,013,753

CLASS 266

76 4,013,277
213 4,013,278
249 4,013,279

CLASS 269

60 4,013,280
61 4,013,281
289 MR 4,013,282

CLASS 271

14 4,013,283
183 4,013,284
261 4,013,285

CLASS 272

8 R 4,013,286
136 4,013,287

CLASS 273

67 A 4,013,288
73 D 4,013,289
73 E 4,013,290
102.2 R 4,013,292
130 A 4,013,291
131 AD 4,013,293
134 B 4,013,294
162 E 4,013,295

CLASS 274

42 R 4,013,296

CLASS 277

3 4,013,297
75 4,013,298
165 4,013,299

CLASS 280

5 A 4,013,300
95 R 4,013,301
154.5 R 4,013,302
491 D 4,013,303
618 4,013,304
742 4,013,305
745 4,013,306
764 4,013,307
766 4,013,308

CLASS 285

31 4,013,309
110 4,013,310

CLASS 292

59 4,013,311
113 4,013,312

CLASS 294

17 4,013,313
82 R 4,013,314

CLASS 296

83 4,013,315
146 4,013,317

CLASS 297

347 4,013,316
438 4,013,318

CLASS 299

31 4,013,319
33 4,013,320

CLASS 302

59 4,013,321

CLASS 303

18 4,013,322
20 4,013,323
92 4,013,324

CLASS 307

126 4,013,895
214 4,013,896
221 D 4,013,897
235 F 4,013,898
4,013,899
252 K 4,013,900
268 4,013,902
296 4,013,901
300 4,013,903
315 4,013,904

CLASS 308

4 A 4,013,325
9 4,013,326
233 4,013,327

CLASS 310

8.3 4,013,905
13 4,013,906
50 4,013,907
61 4,013,908
180 4,013,909
211 4,013,910

CLASS 312

209 4,013,328

CLASS 313

226 4,013,912
242 4,013,913
313 4,013,914
499 4,013,915
510 4,013,916

CLASS 315

3.5 4,013,917
71 4,013,918
73 4,013,919
4,013,920
241 R 4,013,921
362 4,013,922
411 4,013,923

CLASS 318

39 4,013,932
467 4,013,933

CLASS 320

35 4,013,934

CLASS 321

2 4,013,935
4,013,936
7 4,013,937
14 4,013,938

CLASS 323

17 4,013,939
22 T 4,013,940
45 4,013,941
119 4,013,942

CLASS 324

33 4,013,943
34 L 4,013,944
34 R 4,013,945
43 R 4,013,946
51 4,013,947
52 4,013,948
58 B 4,013,949
58.5 R 4,013,950
72 4,013,955
73 R 4,013,951
119 4,013,952
130 4,013,953
173 4,013,954

CLASS 325

22 4,013,956
25 4,013,957
55 4,013,958
57 4,013,959
139 4,013,960
144 4,013,961
304 4,013,962
308 4,013,963
319 4,013,964
320 4,013,965
363 4,013,966

CLASS 328

124 4,013,968
155 4,013,969

CLASS 329

104 4,013,967
117 4,013,970

CLASS 330

23 4,013,971
29 4,013,972
30 D 4,013,973
34 4,013,974
145 4,013,975

CLASS 331

94.5 D 4,013,977
94.5 G 4,013,976
94.5 L 4,013,978
108 B 4,013,979

CLASS 333

18 4,013,980
28 R 4,013,981
72 4,013,982
4,013,983

CLASS 335

185 4,013,984

CLASS 336

5 4,013,985
75 4,013,986
206 4,013,987

CLASS 337

89 4,013,988
227 4,013,989

CLASS 339

9 E 4,013,329
31 R 4,013,330
59 R 4,013,331
98 4,013,332
4,013,333
113 R 4,013,334
144 R 4,013,335
253 R 4,013,336
258 R 4,013,337

CLASS 340

3 C 4,013,991
3 T 4,013,990
10 4,013,992
19 R 4,013,993
33 4,013,994
65 4,013,995
70 4,013,996
146.1 AL 4,013,997
146.2 4,013,998
146.3 H 4,013,999
146.3 MA 4,014,000
147 MD 4,014,001
168 B 4,014,002
171 R 4,014,003
172.5 4,014,004
4,014,005
4,014,006
173 R 4,014,007
4,014,008
174 T F 4,014,009
199 4,013,911
244 A 4,014,010
324 AD 4,014,017
324 R 4,014,011
336 4,014,012
4,014,013
347 P 4,014,015
347 SY 4,014,014
384 R 4,014,016

CLASS 343

5 VQ 4,014,018
5 W 4,014,019
7 AG 4,014,020
13 R 4,014,022
14 4,014,021
100 SA 4,014,023
106 R 4,014,024
4,014,025
766 4,014,026
779 4,014,027
895 4,014,028

CLASS 346

1 4,014,029
160 4,014,030

CLASS 350

3.5 4,013,338
16 4,013,339
36 4,013,340
70 4,013,341
96 C 4,013,000
4,013,342
160 LC 4,013,344
160 R 4,013,343
161 S 4,013,345
176 4,013,346
188 4,013,347
196 4,013,348
214 4,013,349
4,013,350
293 4,013,351

CLASS 352

35 4,013,352

CLASS 353

99 4,013,353

CLASS 354

5 4,014,031
93 4,014,032
142 4,014,033
152 4,014,034
209 4,014,035

CLASS 355

3 R 4,013,354
4 4,013,355
10 4,013,356
13 4,013,357
14 4,013,358
16 4,013,359
27 4,013,360
60 4,013,361
75 4,013,362
97 4,013,363

CLASS 356

73 4,013,364
106 LR 4,013,365
106 R 4,013,366
200 4,013,367
246 4,013,368

CLASS 357

24 4,014,036
52 4,014,037

CLASS 358

29 4,014,038
111 4,013,833
128 4,013,830
133 4,013,828
166 4,013,834
212 4,013,832
263 4,013,827
299 4,013,829
4,013,831

CLASS 360

72 4,014,039
73 4,014,040
88 Re.29,159
96 4,014,041
132 4,014,042
137 4,014,043

CLASS 361

18 4,013,925
49 4,013,924
115 4,013,926
119 4,013,927
172 4,013,930
187 4,013,931
357 4,013,929
380 4,013,928

CLASS 401

139 4,013,369
175 4,013,370

CLASS 403

187 4,013,371
237 4,013,372
291 4,013,373
408 4,012,884
4,012,885

CLASS 404

25 4,013,374
98 4,013,375

CLASS 415

117 4,013,376
161 4,013,377
209 4,013,378

CLASS 417

100 4,013,379
218 4,013,380
222 4,013,381
332 4,013,382
366 4,013,383
368 4,013,384
377 4,013,385
389 4,013,386
554 4,013,387

CLASS 418

108 4,013,388

CLASS 423

27 4,013,754
82 4,013,755
299 4,013,756
358 4,013,757
407 4,013,758
445 4,013,759
449 4,013,760
477 4,013,761
490 4,013,796
573 R 4,013,779
575 4,013,780
579 4,013,781
613 4,013,782
622 4,013,783

CLASS 424

19 4,013,784
23 4,013,785
70 4,013,786
4,013,787
92 4,013,788
115 4,013,789
128 4,013,790
177 4,013,791
181 4,013,792
210 4,013,793
212 4,013,794
219 4,013,795
242 4,013,762
246 4,013,763
4,013,764
4,013,765
4,013,766
249 4,013,767
251 4,013,768
4,013,778
263 4,013,659
4,013,769
273 4,013,770
275 4,013,771
278 4,013,772
284 4,013,773
285 4,013,774
315 4,013,776
316 4,013,777

CLASS 425

21 4,013,389
47 4,013,390
145 4,013,391
157 4,013,392
245 R 4,013,393
405 H 4,013,394

CLASS 426

56 4,013,797
107 4,013,798
285 4,013,775
536 4,013,800
548 4,013,801
578 4,013,799
621 4,013,802

CLASS 427

8 4,013,803
33 4,013,804
54 4,013,806
184 4,013,807
289 4,013,808
296 4,013,809
390 R 4,013,805

CLASS 428

35 4,013,811
245 4,013,812
272 4,013,813
277 4,013,814
285 4,013,815
288 4,013,816
308 4,013,810
412 4,013,696
462 4,013,817

CLASS 429

112 4,013,818
187 4,013,819

CLASS 431

9 4,013,395
11 4,013,396
291 4,013,397
344 4,013,398
351 4,013,399

CLASS 432

75 4,013,400
164 4,013,401
223 4,013,402
239 4,013,403

CLASS 526

129 4,013,822
166 4,013,823
205 4,013,824
208 4,013,825
245 4,013,627

CLASS 536

64 4,013,820
88 4,013,821

D2—	10	243,721
	24	243,722
	190	243,723
	191	243,724
	244	243,725
D6—	69	243,726
		243,727
	71	243,728
	75	243,729
	85	243,730
	95	243,731
	127	243,732
		243,733
	134	243,734
	186	243,735
	203	243,736
D7—	62	243,737
	71	243,738
	105	243,739
	110	243,740
	131	243,741
D8—	69	243,742
	98	243,743
	318	243,744
	359	243,745
		243,746
	396	243,747
16—	59	243,761
D10—	40	243,748
	71	243,749
	91	243,750
	122	243,751
D12—	32	243,752
	102	243,753
	111	243,754
		243,755
	142	243,756
	147	243,757
D13—	33	243,772
D14—	44	243,771
	58	243,773
	71	243,794
D15—	7	243,796
	28	243,759
D16—		243,758
	42	243,760
	65	243,762
D19—	59	243,763
	73	243,764
D22—	19	243,765
D23—	1	243,766
	3	243,767
	4	243,768
	36	243,769
D24—	23	243,776
D25—	9	243,770
D27—	6	243,774
	36	243,775
D28—	19	243,800
D34—	5 BG	243,781
	5 GH	243,778
	5 JJ	243,780
	5 NN	243,777
	5 PP	243,782
	15 AJ	243,786
	15 M	243,783
	15 R	243,779
		243,784
		243,785
D47—	6 E	243,788
		243,789
		243,790
D48—	24 A	243,787
	32 A	243,791
		243,792
		243,793
D64—	11 R	243,795
D83—	1 U	243,797
	1.0	243,798
	12 R	243,799

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 4,012,987	4,013,259	8 : 4,014,028	4,012,887	4,013,410	4,012,886
2 : 4,013,104	4,013,260	4,013,125	4,013,006	4,013,545	4,013,106
4 : 4,013,007	4,013,263	4,013,251	4,013,026	4,013,548	4,013,168
4,013,049	4,013,272	4,013,264	4,013,097	4,013,557	4,013,493
4,013,233	4,013,290	4,013,374	4,013,119	4,013,576	4,013,637
4,013,860	4,013,309	4,013,457	4,013,184	4,013,606	24 : 4,012,911
5 : 4,013,196	4,013,329	4,013,544	4,013,389	4,013,643	4,013,019
4,013,203	4,013,341	9 : 4,012,901	4,013,504	4,013,644	4,013,161
4,013,398	4,013,352	4,013,024	15 : 4,013,087	4,013,666	4,013,413
6 : 4,012,794	4,013,355	4,013,045	16 : 4,012,860	4,013,667	4,013,426
4,012,808	4,013,360	4,013,164	4,013,241	4,013,668	4,014,026
4,012,822	4,013,379	4,013,202	17 : Re.29,158	4,013,675	25 : 4,012,811
4,012,866	4,013,428	4,013,235	Re.29,159	4,013,714	4,012,812
4,012,884	4,013,484	4,013,284	4,012,798	4,013,733	4,012,813
4,012,929	4,013,489	4,013,291	4,012,802	4,013,735	4,012,821
4,012,947	4,013,492	4,013,311	4,012,806	4,013,737	4,012,823
4,012,950	4,013,495	4,013,359	4,012,868	4,013,738	4,012,836
4,012,953	4,013,507	4,013,376	4,012,908	4,013,820	4,012,850
4,012,955	4,013,532	4,013,459	4,012,928	4,013,849	4,013,066
4,012,969	4,013,547	4,013,497	4,012,935	4,013,856	4,013,128
4,012,970	4,013,561	4,013,553	4,012,951	4,013,870	4,013,167
4,012,972	4,013,562	4,013,620	4,012,960	4,013,873	4,013,177
4,012,984	4,013,568	4,013,662	4,012,976	4,013,925	4,013,239
4,012,989	4,013,616	4,013,681	4,012,996	4,013,927	4,013,256
4,012,991	4,013,626	4,013,691	4,012,997	4,013,930	4,013,262
4,012,998	4,013,685	4,013,789	4,013,030	4,013,962	4,013,285
4,012,999	4,013,741	4,013,882	4,013,037	4,013,964	4,013,383
4,013,012	4,013,750	4,013,890	4,013,050	4,014,015	4,013,395
4,013,023	4,013,766	4,013,921	4,013,053	4,014,019	4,013,539
4,013,031	4,013,774	4,013,945	4,013,064	18 : 4,012,968	4,013,798
4,013,048	4,013,801	10 : 4,013,126	4,013,069	4,013,057	4,013,805
4,013,068	4,013,832	4,013,594	4,013,072	4,013,070	4,013,835
4,013,074	4,013,838	4,013,624	4,013,086	4,013,147	4,013,842
4,013,080	4,013,861	4,013,627	4,013,112	4,013,372	4,013,851
4,013,091	4,013,864	4,013,704	4,013,118	4,013,651	4,013,885
4,013,092	4,013,876	4,013,792	4,013,120	4,013,654	4,013,913
4,013,109	4,013,881	11 : 4,012,910	4,013,129	4,013,658	4,013,914
4,013,122	4,013,916	12 : 4,012,865	4,013,130	4,013,880	4,013,946
4,013,123	4,013,939	4,012,988	4,013,139	4,013,941	4,014,006
4,013,124	4,013,943	4,013,013	4,013,157	4,013,958	26 : 4,012,807
4,013,135	4,013,944	4,013,033	4,013,160	4,014,035	4,012,838
4,013,145	4,013,949	4,013,062	4,013,187	19 : 4,012,891	4,012,863
4,013,149	4,013,965	4,013,295	4,013,197	4,012,892	4,012,869
4,013,166	4,013,966	4,013,296	4,013,215	4,013,110	4,012,872
4,013,195	4,013,968	4,013,315	4,013,228	4,013,303	4,012,880
4,013,201	4,013,977	4,013,419	4,013,249	4,013,929	4,012,904
4,013,208	4,013,990	4,013,432	4,013,266	4,013,969	4,012,942
4,013,222	4,013,991	4,013,558	4,013,298	20 : 4,013,751	4,012,975
4,013,231	4,013,995	4,013,797	4,013,312	4,013,761	4,012,982
4,013,236	4,014,001	4,013,854	4,013,336	4,013,865	4,012,983
4,013,240	4,014,002	4,013,992	4,013,369	21 : 4,013,027	4,013,029
4,013,245	4,014,011	4,013,994	4,013,375	4,013,297	4,013,047
4,013,253	4,014,016	13 : 4,012,885	4,013,409	22 : 4,012,862	4,013,054

4,013,102
4,013,117
4,013,143
4,013,154
4,013,188
4,013,213
4,013,214
4,013,218
4,013,254
4,013,257
4,013,302
4,013,307
4,013,332
4,013,570
4,013,683
4,013,688
4,013,693
4,013,695
4,013,707
4,013,728
4,013,730
4,013,799
4,013,802
4,013,808
4,013,850
4,013,862
27 : 4,012,832
4,012,834
4,012,839
4,012,878
4,013,137
4,013,224
4,013,230
4,013,278
4,013,282
4,013,293
4,013,328
4,013,388
4,013,396
4,013,423
4,013,444
4,013,494
4,013,498
4,013,586
4,013,670
4,013,692
4,013,804
4,013,846
4,013,902
28 : 4,012,876
4,013,138
29 : 4,012,801
4,012,913
4,012,962
4,013,171
4,013,185
4,013,190
4,013,226
4,013,324
4,013,381
4,013,382
4,013,422
4,013,443
4,013,448
4,013,450
4,013,514
4,013,524
4,013,694
4,013,852
4,013,888
4,014,020
31 : 4,012,967
4,013,313
32 : 4,013,955
33 : 4,012,909

34 : 4,013,169
4,012,796
4,012,831
4,012,842
4,012,846
4,012,921
4,012,959
4,012,971
4,013,000
4,013,077
4,013,103
4,013,152
4,013,209
4,013,212
4,013,267
4,013,270
4,013,289
4,013,316
4,013,321
4,013,345
4,013,351
4,013,353
4,013,368
4,013,386
4,013,402
4,013,442
4,013,466
4,013,475
4,013,501
4,013,516
4,013,523
4,013,543
4,013,549
4,013,552
4,013,577
4,013,582
4,013,593
4,013,622
4,013,634
4,013,641
4,013,646
4,013,660
4,013,671
4,013,673
4,013,686
4,013,703
4,013,722
4,013,732
4,013,734
4,013,757
4,013,767
4,013,771
4,013,778
4,013,785
4,013,828
4,013,830
4,013,872
4,013,879
4,013,900
4,013,920
4,013,960
4,014,009
4,014,010
4,014,022
4,014,024
4,014,025
36 : Re.29,157
4,012,827
4,012,854
4,012,857
4,012,875
4,012,903
4,012,934
4,012,940
4,012,949

4,012,966
4,013,016
4,013,039
4,013,041
4,013,059
4,013,063
4,013,065
4,013,083
4,013,084
4,013,200
4,013,252
4,013,280
4,013,292
4,013,319
4,013,361
4,013,378
4,013,397
4,013,400
4,013,404
4,013,453
4,013,458
4,013,460
4,013,462
4,013,463
4,013,464
4,013,485
4,013,486
4,013,528
4,013,529
4,013,530
4,013,546
4,013,572
4,013,583
4,013,584
4,013,613
4,013,621
4,013,623
4,013,633
4,013,635
4,013,640
4,013,649
4,013,652
4,013,665
4,013,696
4,013,697
4,013,729
4,013,748
4,013,752
4,013,758
4,013,786
4,013,812
4,013,814
4,013,815
4,013,859
4,013,875
4,013,891
4,013,892
4,013,893
4,013,936
4,013,953
4,013,974
4,014,004
4,014,005
4,014,017
4,014,029
4,014,030
4,014,036
4,014,038
37 : 4,012,896
4,013,038
4,013,101
4,013,183
4,013,331
4,013,559
4,013,858

39 : Re.29,156
4,012,814
4,012,820
4,012,851
4,012,889
4,012,965
4,013,005
4,013,018
4,013,034
4,013,111
4,013,134
4,013,141
4,013,155
4,013,186
4,013,234
4,013,271
4,013,326
4,013,363
4,013,414
4,013,434
4,013,435
4,013,437
4,013,438
4,013,461
4,013,496
4,013,517
4,013,519
4,013,535
4,013,537
4,013,564
4,013,566
4,013,573
4,013,574
4,013,581
4,013,598
4,013,710
4,013,762
4,013,796
4,013,847
4,013,848
4,013,853
4,013,894
4,013,910
4,013,912
4,013,919
4,013,932
4,013,954
4,013,988
40 : 4,012,902
4,013,090
4,013,268
4,013,387
4,013,420
4,013,571
4,013,754
4,013,824
4,013,928
41 : 4,012,930
4,012,973
4,013,051
4,013,855
4,013,934
42 : 4,012,828
4,012,835
4,012,847
4,012,873
4,012,874
4,012,888
4,012,920
4,012,946
4,013,035
4,013,073
4,013,081
4,013,082

4,013,096
4,013,142
4,013,198
4,013,199
4,013,211
4,013,216
4,013,217
4,013,283
4,013,287
4,013,322
4,013,323
4,013,377
4,013,394
4,013,403
4,013,407
4,013,411
4,013,429
4,013,433
4,013,454
4,013,474
4,013,490
4,013,513
4,013,520
4,013,538
4,013,550
4,013,563
4,013,575
4,013,596
4,013,597
4,013,647
4,013,705
4,013,764
4,013,765
4,013,775
4,013,777
4,013,803
4,013,836
4,013,844
4,013,867
4,013,877
4,013,887
4,013,899
4,013,904
4,013,915
4,013,926
4,013,984
4,013,987
4,013,989
4,013,993
4,014,014
44 : Re.29,155
4,012,956
4,012,961
4,013,206
4,013,237
4,013,813
4,014,023
45 : 4,012,816
4,013,601
4,013,614
47 : 4,012,853
4,013,078
4,013,131
48 : 4,012,852
4,012,877
4,012,912
4,012,917
4,012,944
4,013,008
4,013,032
4,013,046
4,013,158
4,013,172
4,013,178

49 : 4,012,861
4,013,010
4,013,299
4,013,318
4,013,365
4,013,477
4,013,491
4,013,840
51 : 4,013,127
4,013,207
4,013,294
4,013,418
4,013,479
4,013,555
4,013,664
4,013,810
4,013,938
4,013,950
4,013,959
53 : 4,012,797
4,012,799
4,012,957
4,013,042
4,013,210
4,013,219
4,013,247
4,013,772
4,013,905
4,013,967
54 : 4,013,182
4,013,638
4,013,700
55 : 4,012,804
4,012,900
4,012,963
4,013,061
4,013,105
4,013,136
4,013,174
4,013,176
4,013,227
4,013,310
4,013,399
4,013,500
4,013,560
4,013,595
4,013,607
4,013,629
4,013,807
4,013,811
4,013,816
4,013,985

4,013,225
4,013,269
4,013,300
4,013,362
4,013,385
4,013,480
4,013,502
4,013,556
4,013,569
4,013,604
4,013,724
4,013,743
4,013,780
4,013,833
4,013,837
4,013,869
4,013,874
4,013,901
4,013,997
4,013,999
4,014,012
4,014,013

DESIGN PATENTS

4 : 243,725
6 : 243,738
243,740
243,760
243,761
243,763
243,767
243,772
243,777
243,778

8 : 243,748
9 : 243,741
243,762
243,799
12 : 243,769
243,776
13 : 243,734
17 : 243,737
243,766

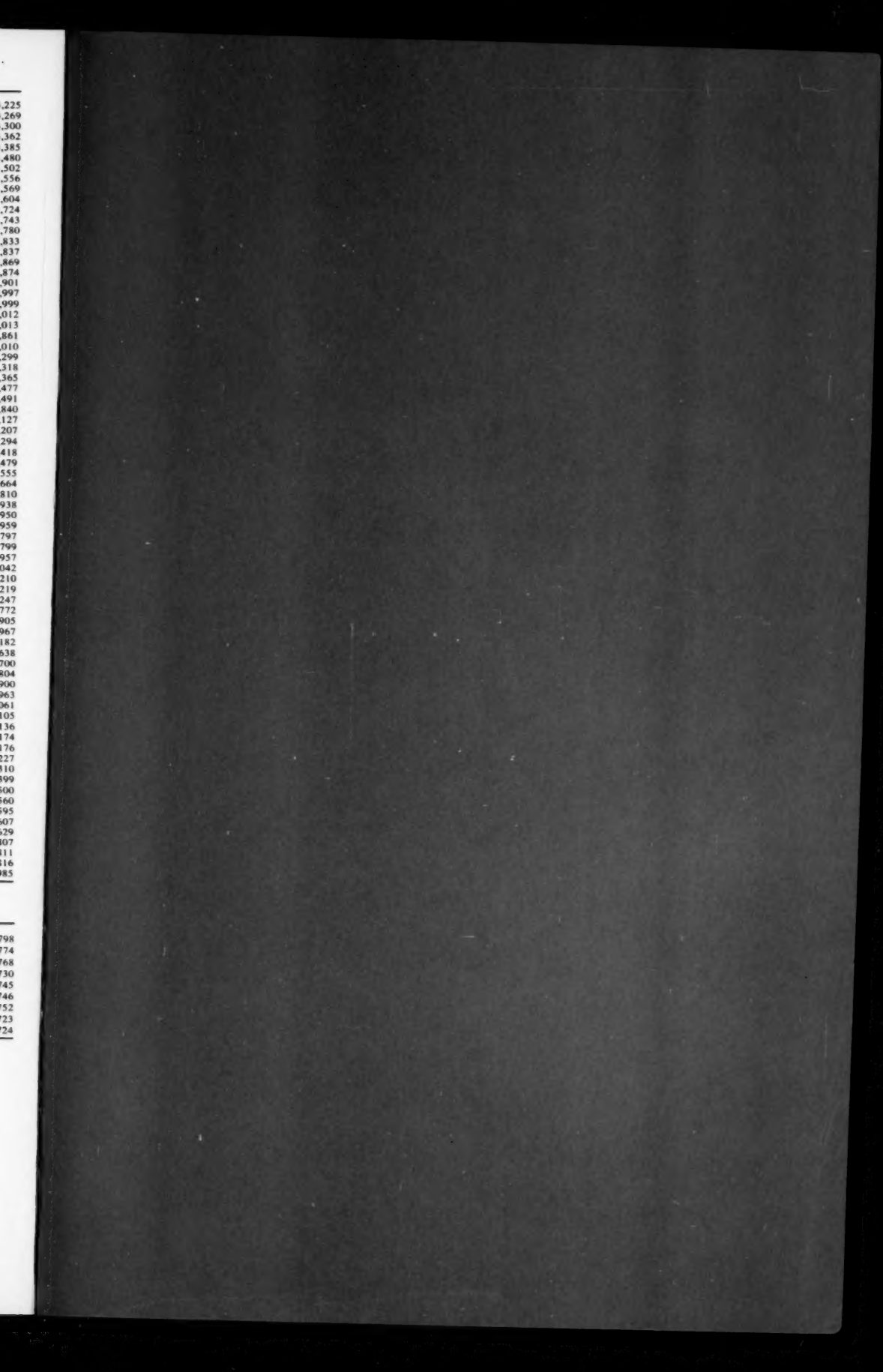
243,786
243,791
243,792
243,793
24 : 243,742
243,787
25 : 243,751
243,754
243,755
243,771
26 : 243,732

243,743
243,749
243,753
243,770
27 : 243,796
34 : 243,735
243,773
36 : 243,750
243,758
243,782

243,783
243,797
243,800
39 : 243,731
243,733
243,739
243,759
243,784
243,785

243,798
42 : 243,774
43 : 243,768
48 : 243,730
243,745
243,746
50 : 243,752
56 : 243,723
243,724

U. S. GOVERNMENT PRINTING OFFICE : O - 1977



U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner